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LORAIN LT15R

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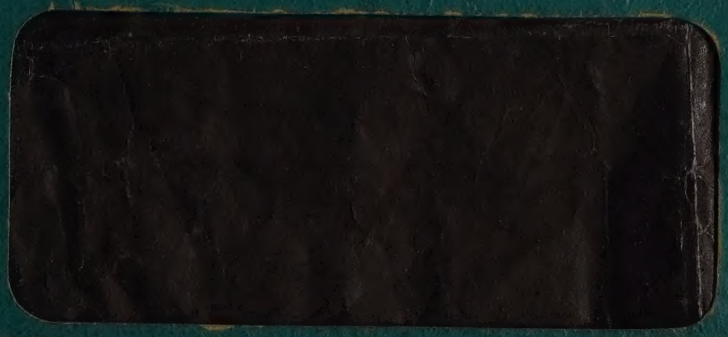


LORAIN LT15R

instructions

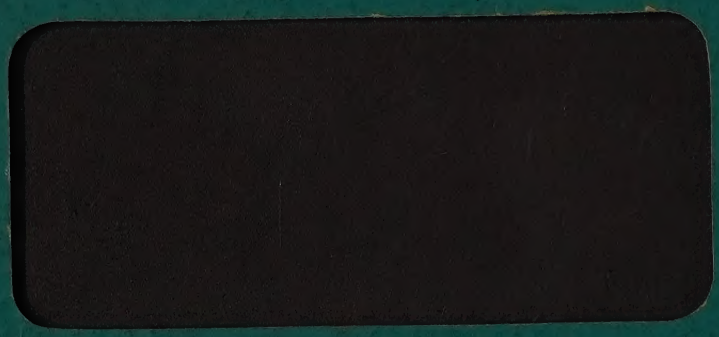
INSTALLATION

OPERATION

MAINTENANCE

DESIGNERS AND MANUFACTURERS OF

wer equipment without moving parts SUB-CYCLE® CONVERTERS AND FLOTROL® RECTIFIERS



FOR PARTS OR SERVICE, Contact

Lorain Products Corporation
Service Department
1122 "F" Street
Lorain, Ohio 44052
PH: (216) 288-9191
TWX: 810-426-2130

NOTE

PROGRAMMED PREVENTIVE MAINTENANCE Is Available On This And Other Lorain Products Manufactured Equipment. For Further Information, Contact "Service Manager" At The Above Address.

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TWO NOTE "GROUPS"

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SEE ISSUE SHEET.

Permits

LORAIN

SUB-CYCLE®

MODEL LT15R

Spec. No. 5125-001

4539

MODEL SPECIFICATION TABLE

Model	Spec. No.	Frequency Generators
LT15R	5125-001	5 FREQUENCY GENERATORS
LT15RA	5125-002	4 FREQ. GEN. #1 OMITTED
LT15RB	5125-003	4 FREQ. GEN. #2 OMITTED
LT15RC	5125-004	4 FREQ. GEN. #5 OMITTED
LT15RD	5125-005	5 FREQ. GEN. #2 IS 20 HZ. ONLY
LT15RE	5125-006	4 FREQ. GEN. #3 OMITTED
LT15RF	5125-007	2 #1 FREQ. GEN. & 2 #2 FREQ. GEN.
LT15R	5125-015	2 FREQ. GEN. #1 & #2 ONLY

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INSTRUCTIONS
LORAIN MODEL LT15R SUB-CYCLE RINGING GENERATOR
SD-1433-01

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LORAIN PRODUCTS CORPORATION
Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

Form 1220

INSTRUCTIONS
LORAIN MODEL LT15R SUB-CYCLE RINGING GENERATOR
SD-1433-01

1. RATINGS

Input: 46 to 54 volt d-c; 3.0 amperes

Tone output: ringback tone, level adjustable in 6 decibel steps between 1.5 volts and 24 volts; 300 milliwatt total

Ringing output: five ringing frequencies, voltage independently adjustable at each frequency; 15 watt output at each frequency; ringing frequencies factory-adjusted to user requirements, such as:

Harmonic series: 16-2/3, 25, 33-1/3, 50, 66-2/3 cycles

Decimonic series: 20, 30, 40, 50, 60 cycles

Synchromonic series: 16 or 20, 30, 42, 54, 66 cycles

NOTE: Certain LT15R Ringing Generators carry a letter suffix; these letter suffixes denote a modification of a standard Model LT15R Ringing Generator, as indicated in Note 107 of Schematic Diagram SD-1433-01.

2. DESCRIPTION

a. General

LORAIN Model LT15R SUB-CYCLE Ringing Generator supplies five ringing frequencies and ringback tone from nominal 50 volt battery. Therefore, it will continue to furnish ringing current and ringback tone despite a-c power failure. Since this Ringing Generator contains no vibrating or rotating parts, it does not require periodic maintenance or adjustment.

Each of five separate ringing generator sub-chassis produces one ringing frequency; output frequency of each subchassis is stable within plus or minus 1/3 cycle, despite input d-c voltage variation between 46 and 54 volts, or ringing load current variation between zero and full rated output. Since each subchassis is self-protected against overload, ringing overload will not cause fuses to open.

2. a. (continued)

Ringback tone is furnished by a tone generator subchassis. Connections can be made to superimpose ringback tone on ringing current at any one, any combination, or all ringing frequencies or, if desired, ringback tone can be obtained separate from all ringing frequencies.

LORAIN Model LT15R SUB-CYCLE Ringing Generator has a support frame which can be mounted in a 19 inch relay rack. Adapters are furnished to convert this frame to 23 inch relay rack mounting.

All five ringing generator subchassis and tone generator subchassis are mounted as one assembly; this assembly can easily be removed from its support frame, without need to unsolder electrical leads which connect it to office equipment. This gives access to ringing voltage and ringback tone level adjustments; test and adjustment can be made at a test bench.

Two or more LORAIN Model LT15R SUB-CYCLE Ringing Generators can be operated in parallel to supply ringing current greater than rated output of one unit. Additional Model LT15 Ringing Generators can be installed at a later date, as necessary to meet increased ringing current requirements caused by growth.

b. Accessories

An accessory Type 250K Remote Control Relay is factory-installed when specified. It is also available for user installation.

When this Ringing Generator is removed from its support frame, it can be connected to its operating input, output, and paralleling circuits with an accessory Test Cord. Two Test Cords are available: Type 575P, eight feet long, and Type 583P, fifteen feet long.

A 1070AS replacement spare parts kit includes all fuses and semiconductor components required to repair either a ringing generator subchassis or a tone generator subchassis.

3. INSTALLATION

a. Mounting

LORAIN Model LT15R SUB-CYCLE Ringing Generator is designed to mount in a 19 inch relay rack. It requires 5-1/4 inches panel space, extends 5 inches to front of rack, and has overall depth of 12-7/8 inches. It can also be mounted in a 23 inch relay rack, using two adapters furnished.

3. a. (continued)

CAUTION: In mounted position, ventilating perforations at top, and chassis opening at bottom of Ringing Generator must be unobstructed. This is essential to proper cooling during operation.

CAUTION: LORAIN Model LT15R SUB-CYCLE Ringing Generator should be installed at a location in which ambient temperature will not increase beyond 125°F or decrease below 10°F.

b. Output Connections

All installer connections are made to solder-type terminals on a terminal block at center rear of Ringing Generator support frame. Ringing and ringback tone output terminals are as follows:

Signal	Terminals
Ringing frequency 1	23, 24
Ringing frequency 2	20, 21
Ringing frequency 3	17, 18
Ringing frequency 4	14, 15
Ringing frequency 5	11, 12
Ringback tone	8, 9

NOTE: Ringing frequency 1 is lowest; frequencies 2, 3, 4, and 5 are successively higher. One side (either terminal) of each ringing output can be connected in common with one side of each other ringing output. Either ring trip battery or ring trip ground can be connected to ringing common.

Ringing current and ringback tone can be obtained separately by connections at terminals indicated above. Also, ringback tone can be superimposed on ringing current at any one, any combination, or all ringing frequencies, as follows:

3. b. (1) To superimpose ringback tone on ringing current at any one ringing frequency, connect tone output in series between ringing common and one side of ringing output at this frequency. Figure 1A shows connections necessary to superimpose ringback tone on frequency 2 only; this method can, of course, be used to superimpose ringback tone on any desired ringing frequency.

(2) To superimpose ringback tone on ringing current at any combination of ringing frequencies, or all ringing frequencies, connect tone output in series between ringing common and one side, in common, of desired ringing frequencies. Figure 1B shows connections to superimpose ringback tone on all ringing frequencies.

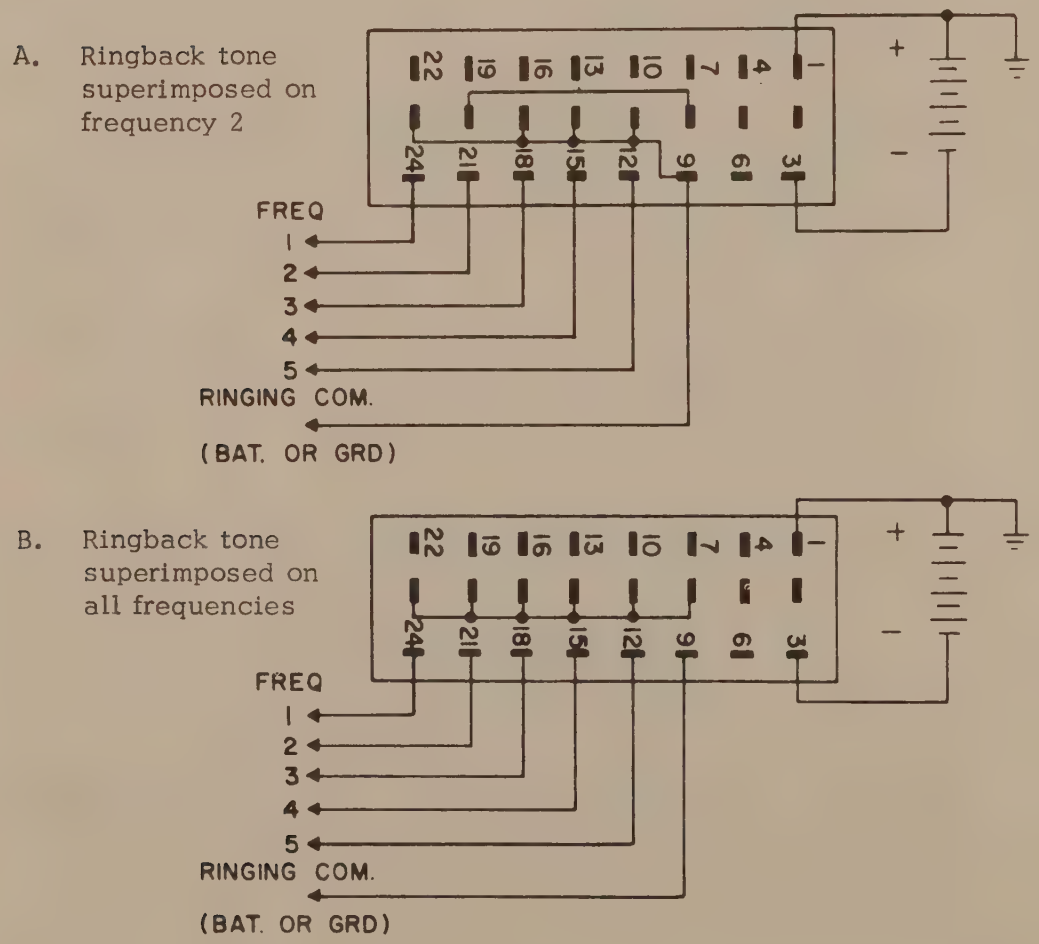
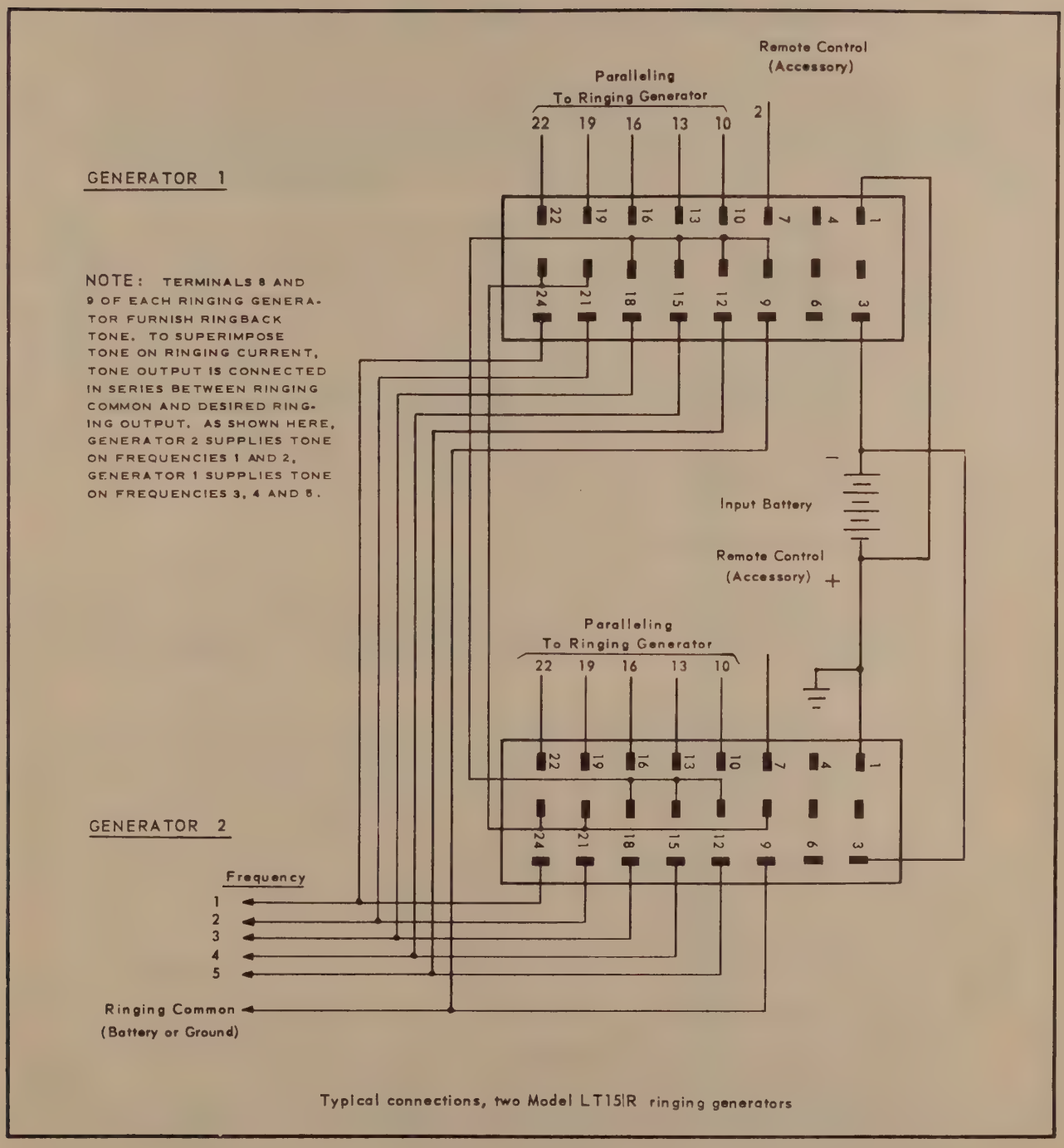


Figure 1. Typical Connections, One Model LT15R Ringing Generator


Remote Control
(Accessory)
Paralleling
To Ringing Generator
22 19 16 13 10
2
GENERATOR 1
NOTE: TERMINALS 8 AND 9 OF EACH RINGING GENERATOR FURNISH RINGBACK TONE. TO SUPERIMPOSE TONE ON RINGING CURRENT, TONE OUTPUT IS CONNECTED IN SERIES BETWEEN RINGING COMMON AND DESIRED RINGING OUTPUT. AS SHOWN HERE, GENERATOR 2 SUPPLIES TONE ON FREQUENCIES 1 AND 2, GENERATOR 1 SUPPLIES TONE ON FREQUENCIES 3, 4 AND 5.
Input Battery
Remote Control
(Accessory)
Paralleling
To Ringing Generator
22 19 16 13 10
GENERATOR 2
Frequency
1
2
3
4
5
Ringing Common
(Battery or Ground)

Typical connections, two Model LT15IR ringing generators

Form 1220

3. c. Parallel-connected Ringing Generators

When two or more LORAIN Model LT15R SUB-CYCLE Ringing Generators are to operate in parallel, connect each of terminals 10, 13, 16, 19, and 22 of this unit to corresponding terminal of each parallel-connected unit. These connections will cause output of all parallel-connected ringing generator subchassis to remain in phase at each ringing frequency.

NOTE: When two or more LORAIN Model LT15R SUB-CYCLE Ringing Generators are operated in parallel, only one unit should be connected to supply superimposed ringback tone at any one ringing frequency. In no case should tone generators of two units be connected in parallel. Figure 2 shows connections to two units in which generator 1 supplies ringback tone superimposed on frequencies 1 and 2 while generator 2 furnishes ringback tone superimposed on frequencies 3, 4, and 5. Of coarse, this method of connection can be used with any combination of ringing frequencies so long as ringback tone output of any two generators is not connected in parallel.

d. Input Connections

Supply nominal 50 volt negative battery at input terminal 3 and connect input terminal 1 to office ground. If this Ringing Generator has an accessory remote control relay, connect a remote control device to furnish office ground at terminal 7.

NOTE: Positive input terminal 1 is connected to terminal 4, which is then bonded to chassis ground by a jumper. This jumper protects transistors against incorrect input polarity; if desired, it can be removed after proper input connections have been made.

CAUTION: Do not use larger than 1/2 ampere trip battery fuse.

4. ADJUSTMENT

a. General

A fine-adjustment potentiometer sets output frequency of each ringing generator subchassis to exact value. These adjustments are accessible at front of Ringing Generator when it is installed in its support frame.

CAUTION Two Notes Persists
CHANGES HAVE BEEN MADE ON THIS PAGE. * SEE ISSUE SHEET 2/01/94

4. a. (continued)

Ringing voltage at each ringing frequency, and level of ringback tone, are set by connection of adjustment leads to adjustment terminals. To gain access to these adjustments, insert fingers into indents at lower front of each side of Ringing Generator, then withdraw Ringing Generator forward from support frame.

b. Ringing voltage

Ringing voltage at each ringing frequency is adjusted by connection of a red adjustment lead at one of three taps of corresponding ringing output transformer, T103, T203, T303, T403, or T503, of ringing generator subchassis 1, 2, 3, 4, or 5. Available voltages are as follows:

Frequency 1

Voltage	85	97	110
T103 connection	L	M	H

Frequency 2

Voltage	95	110	125
T203 connection	L	M	H

Frequency 3

Voltage	95	110	125
T303 connection	L	M	H

Frequency 4

Voltage	100	120	140
T403 connection	L	M	H

Frequency 5

Voltage	100	120	140
T503 connection	L	M	H

NOTE: If two or more LORAIN Model LT15R SUB-CYCLE Ringing Generators are to operate in parallel, ringing voltage setting of ringing generator subchassis should be identical in each unit at each ringing frequency.

Persist

CAUTION ONE NOTE
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* SEE ISSUE SHEET. 02/07/94

4. b. (continued)

NOTE: In a large office which has a relatively large number of low-impedance ringers, ringing voltage adjustment lead of each ringing generator subchassis should be connected at tap L of output transformer. Higher voltage settings may result in loss of ringing on heavily loaded circuits.

c. Ringing frequency

Fine adjustment of each ringing frequency, to exact value, is made by a corresponding FREQUENCY ADJUST potentiometer, at front of Ringing Generator. If necessary, a frequency meter can be connected at associated OUTPUT jacks. To adjust:

(1) Loosen shaft locknut of FREQUENCY ADJUST potentiometer to be adjusted.

(2) To increase output frequency, turn screwdriver adjustment shaft of potentiometer clockwise; to decrease output frequency, turn shaft counter-clockwise.

(3) When ringing frequency has been set to exact value, tighten shaft locknut to secure potentiometer shaft in position.

d. Ringback tone level * 352.3 HZ. JH 9/93

Level of ringback tone is adjustable, in 6 decibel steps, between 1.5 volt and 24 volts. This adjustment is made by connection of a blue adjustment lead between terminal C and any one of five adjacent terminals, 1 to 5, on component card of tone generator subchassis. Adjustment settings are as follows:

Tone voltage	1.5	....	3	....	6	....12....24
Adjustment connection	1	....	2	....	3	.... 4 5

e. Factory adjustments

Special factory adjustments are made on each LORAIN Model LT15R SUB-CYCLE Ringing Generator. It is recommended that no change be made in these adjustment settings:

(1) Coarse ringing frequency

Resonant frequency of tuning inductor (T101, T201, T301, T401, or T501) and capacitor (C101, C201, C301, C401, or C501)

4. e. (continued)

* Insure Red lead is on center TAP OF TRANSFORMER in each ringing generator subchassis is adjusted by connection of a slate lead between capacitor and taps of tuning inductor.

Requirements of this adjustment connection are affected both by desired ringing frequency and by characteristics of capacitor-inductor combination. Connections are made as follows:

Generator 1

Frequency (cps):	16	.6-2/3	20
Tap connection:	12T or 13T	11T or 12T	9T or 10T

Generator 2

Frequency (cps):	25	30
Tap connection:	11T or 12T	9T or 10T

Generator 3

Frequency (cps):	33-1/3	40	42
Tap connection:	12T or 13T	10T or 11T	9T or 10T

Generator 4

Frequency (cps):	50	54
Tap connection:	11T or 12T	9T or 10T

Generator 5

Frequency (cps):	60	66	66-2/3
Tap connection:	11T or 12T	9T or 10T	9T or 10T

SEVEN NOTES CAUTION CHANGES HAVE BEEN MADE ON THIS PAGE. SEE ISSUE SHEET. 02/07/94

(2) No-load and full-load ringing voltage

Each ringing generator subchassis is adjusted to supply correct output voltage at both no-load and full-load. These voltages are measured with red ringing voltage adjustment lead connected at output transformer tap M of each subchassis (refer to b, above). Factory setting of each subchassis is as follows:

Frequency:	1	2	3	4	5
Voltage :	~~97~~ 90	~~110~~ 100	~~110~~ 110	~~120~~ 125	~~120~~ 140

Due to slight interaction between no-load voltage adjustment potentiometer R116, R216, R316, R416, or R516, and fine frequency adjustment potentiometer R101, R201, R301, R401, or R501, this procedure is as follows:

4. e. (2) (continued)

(a) With no load applied to ringing generator subchassis, adjust no-load voltage adjustment potentiometer to obtain correct output voltage.

(b) Reset output frequency to exact value with FREQUENCY ADJUST potentiometer (refer to c, above).

(c) Reset no-load voltage adjustment potentiometer to again obtain correct output voltage.

(d) (d) With full rated load applied to ringing generator subchassis, adjust full-load voltage adjustment resistor R117, R217, R317, R417, or R517 to obtain correct output voltage (equal to no-load output voltage). Full load output current of each subchassis is as follows:

Frequency	1	2	3	4	5
Current (ma.)	155	136	136	125	125

CAUTION: Do not attempt to change output voltage of any ringing generator subchassis by changing setting of its no-load output voltage potentiometer. This adjustment should be used only to obtain correct output voltage as indicated above. Ringing voltages can be selected as described in b, above.

(3) Ringing current cutoff

This adjustment is made by potentiometers R115, R215, R315, R415, and R515 to determine value at which an overload cutoff circuit will limit ringing current supplied by each ringing generator subchassis. Current value at which cutoff should occur at each frequency is 235 ma.

(4) Tone generator subchassis

Output frequency and output voltage of this subchassis are adjusted as follows:

@ 110V ... 425 ohms ... 595 ohms @ 140V

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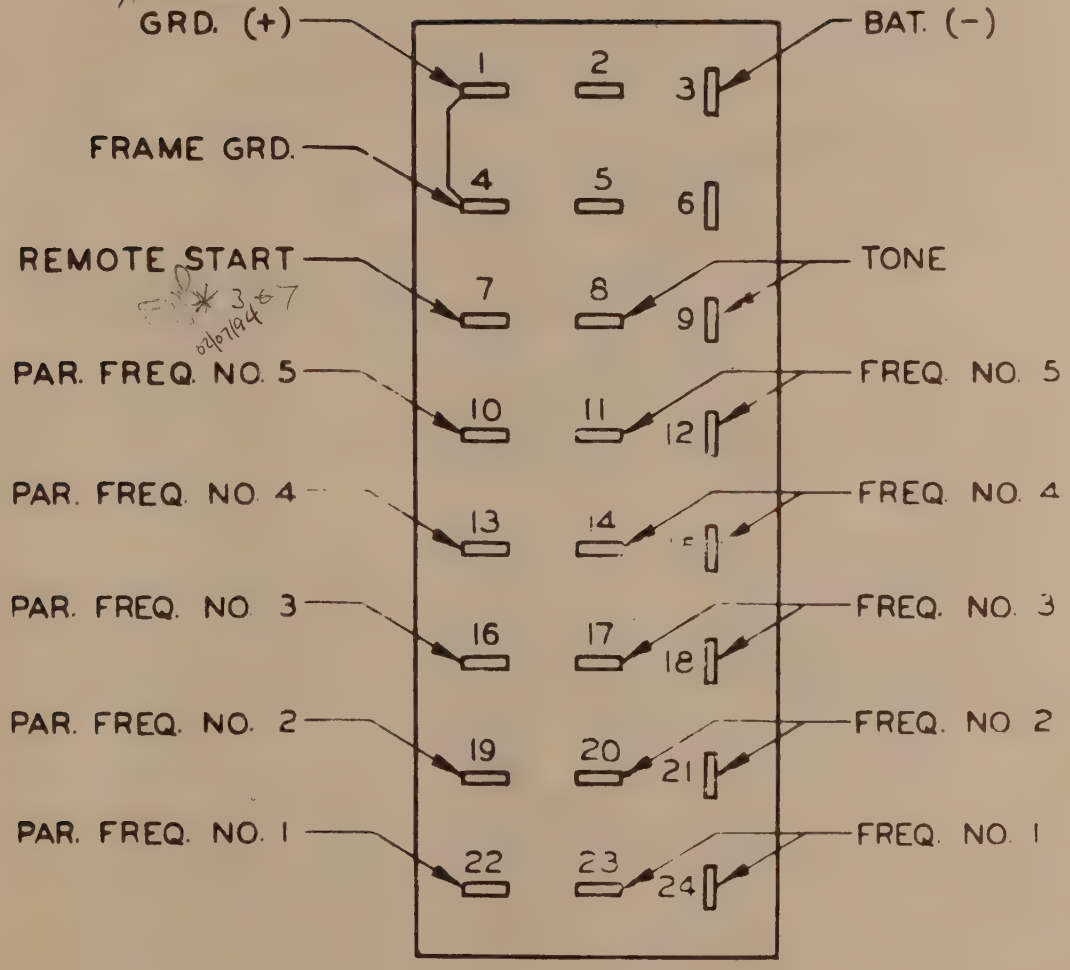

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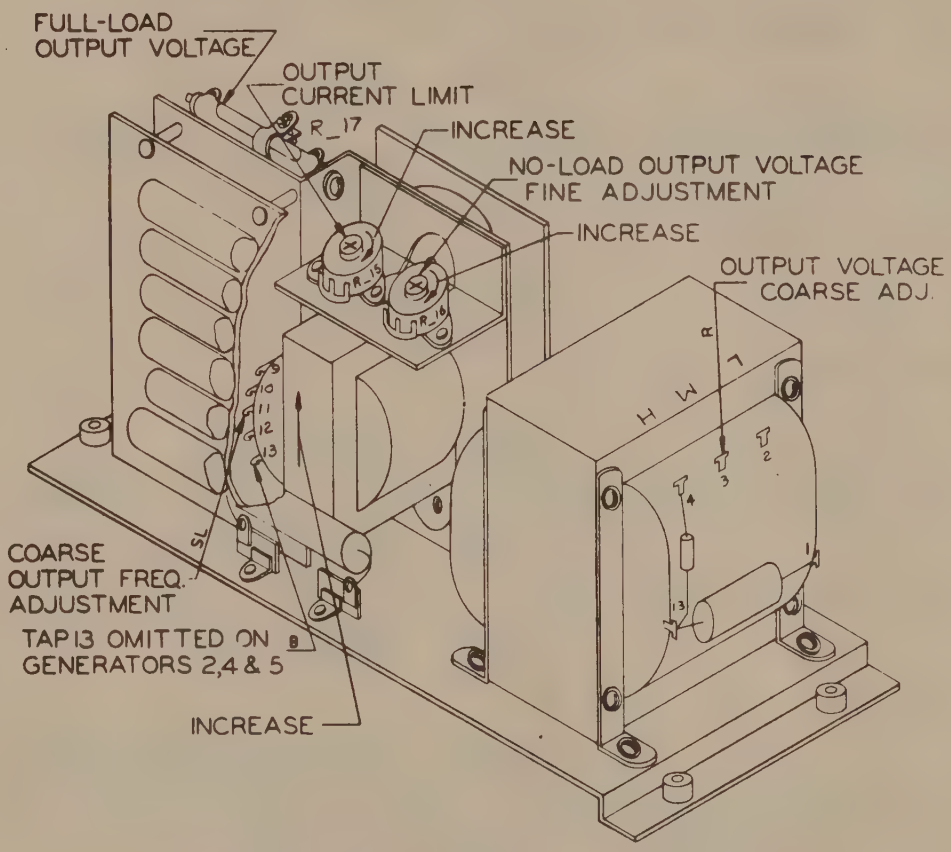
INSTALLERS CONNECTIONS



RINGING GENERATOR CHASSIS ADJUSTMENTS
MODEL LT15

RINGING GENERATOR
CHASSIS ADJUSTMENTS
PAGE 14

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LORAIN, OHIO
AND
LORAIN PRODUCTS (CANADA) LTD. ST. THOMAS, ONTARIO

G.S.	12-13-61	
C.W.	12-15-61	
R.V.D.	12-15-61	FORM 1220

4. e. (4) (continued)

(a) Connect blue lead and yellow lead of capacitor C601 at necessary taps of oscillator transformer T601 to cause tone oscillator to operate at 420 cps.

(b) With no load applied to tone generator, adjust potentiometer R607 to obtain output voltage per adjustment setting in paragraph 4 d.

5. MAINTENANCE

a. General

Since LORAIN Model LT15R SUB-CYCLE Ringing Generator has no vibrating or rotating parts, it requires no periodic maintenance or adjustment.

To gain access to all five ringing generator subchassis, and tone generator subchassis, of this Ringing Generator, insert fingers into indents at lower front of each side, then withdraw Ringing Generator forward from support frame. When Ringing Generator is removed from support frame, it can be connected to its operating input, output, and paralleling circuits by means of an accessory Type 575P or Type 583P Test Cord.

A type 1070AS Replacement Spare Part Kit includes all parts which are subject to failure. This kit is described in paragraph 2 b, above. Failure of any transistor or diode in any ringing generator subchassis will result in loss of ringing current at corresponding ringing frequency; failure of any transistor or diode in tone generator subchassis will cause loss of ringback tone.

b. Fuses

D-c input to each ringing generator subchassis and d-c input to tone generator subchassis is protected by a fuse. Input fuses of ringing generator subchassis are accessible at front of SUB-CYCLE Ringing Generator; Ringing Generator must be removed from its support frame to gain access to input fuse of tone generator subchassis.

Since each subchassis of this Ringing Generator is self-protected against overload, an overload condition should not cause any fuse to open.

If necessary to replace any fuse in this Ringing Generator, replace only with a fuse of size and type as follows, or equivalent:

5. b. (continued)

F101, F201, F301, F401, F501: Bussmann Type MDL cartridge, 1 ampere

F601: Bussmann Type AGC cartridge, 1/2 ampere

c. Troubleshooting

In general, failure of any ringing generator subchassis (loss of ringing current at one ringing frequency) is caused either by failure of one or more of its power amplifier transistors or by failure of some component in its Type 1076AS Semiconductor Assembly. If a semiconductor assembly component is defective, operation will be restored by replacement of semiconductor assembly in ringing generator subchassis affected. Power amplifier transistors are located at rear of ringing generator; they can be tested individually if necessary.

NOTE: Each power transistor supplied in Type 1070AS Replacement Spare Part Kit has a mica insulator, coated with silicone grease. Do not remove silicone grease from insulator: it aids in conduction of heat between transistor and ringing generator to improve heat dissipation.

Failure of either transistor, Q601 or Q602, or shorted diode CR601 in tone generator subchassis will cause loss of tone current. Shorted diode CR605 will reduce tone output and affect tone quality. Failure in either of diodes CR602 or CR603 is likely to cause failure of both diodes; this will be reflected by reduced tone output and halving of low frequency in ringback tone.

LORAIN PRODUCTS CORPORATION
Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

February 26, 1970

ELECTRICAL PARTS LIST
LORAIN MODEL LT15R SUB-CYCLE RINGING GENERATOR
SPEC. NO. 5125-001

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ACCESSORIES			
		(Quantity of spare parts for an accessory applies only if the accessory is furnished with the equipment.)	
	4845-709	Remote Control Relay Assembly	**
ASSEMBLIES			
	4871-023	No. 1 Generator	**
	4871-024	No. 2 Generator	**
	4871-025	No. 3 Generator	**
	4871-026	No. 4 Generator	**
	4871-027	No. 5 Generator	**
	4871-306	Tone and Filter	**
FUSES			
	2484-225	1 Amp, Cartridge	7
RESISTORS			
R101	2683-255	500 Ohm 2 Watt, Variable	1
R201	2683-255	500 Ohm 2 Watt, Variable	*
R301	2683-255	500 Ohm 2 Watt, Variable	*
R401	2683-255	500 Ohm 2 Watt, Variable	*
R501	2683-255	500 Ohm 2 Watt, Variable	*
TRANSISTORS			
Q6	2848-064	5 Amp, PNP	10
Q7	2848-064	5 Amp, PNP	*
Q8	2848-064	5 Amp, PNP	*
Q9	2848-064	5 Amp, PNP	*

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ELECTRICAL PARTS LIST
LORAIN MODEL LT15R SUB-CYCLE RINGING GENERATOR
SPEC. NO. 5125-001

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
MISCELLANEOUS			
	2471-410	Jack, Black	1
	2474-187	Plug, 24 Contacts	1
	2475-762	Connector, Receptacle, 17 Contact	1
	2488-109	Fuseholder	1

LORAIN PRODUCTS CORP.
Lorain, Ohio U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

Printed in U.S.A.

dmb

ELECTRICAL PARTS LIST
LORAIN 4845-709 REMOTE CONTROL RELAY ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the Lorain Equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm Spares column, it indicates the part, assembly or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref Desig	LPC Part No.	Description	Quantity Recm Spares
DIODES			
CR604	2812-121	1N537, Silicon	1
RELAYS			
K601	2542-502		1

LORAIN PRODUCTS CORP.
Lorain, Ohio U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

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ELECTRICAL PARTS LIST
LORAIN 4871-023 NO. 1 GENERATOR ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4337-310	Plug-in Card	1
CAPACITORS			
C101	2713-154	.47UF 100 Volt, DC	1
C101	2713-174	1UF 100 Volt, DC	1
C102	2713-218	.01UF 200 Volt	1
C103	2713-227	.047UF 200 Volt	1
C104	2731-142	100UF 12 Volt, Electrolytic	-
C105	2713-325	.1UF 400 Volt	1
C106	2713-227	.047UF 200 Volt	*
C107	2713-325	.1UF 400 Volt	*
C108	2713-339	.47UF 400 Volt	1
DIODES			
CR105	2812-131	1N538, Silicon	1
RESISTORS			
R103	2614-247	220 Ohm 1/2 Watt	1
R104	2614-247	220 Ohm 1/2 Watt	*
R106	2615-303	47K Ohm 1/2 Watt	1
R107	2615-303	47K Ohm 1/2 Watt	*
R108	2651-342	2.25K Ohm 3 Watt	1
R113	2615-463	1K Ohm 1 Watt	1
R114	2651-340	1.8K Ohm 3 Watt	1
R115	2683-354	500 Ohm 2 Watt, Potentiometer	1
R116	2683-362	1.5K Ohm 2 Watt, Potentiometer	1
R117	2681-403	3 Ohm 10 Watt	1
R118	2615-239	100 Ohm 1/2 Watt	1

ELECTRICAL PARTS LIST
LORAIN 4871-023 NO. 1 GENERATOR ASSEMBLY

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
RESISTORS (cont'd)			
R119	2615-245	180 Ohm 1/2 Watt	1
R120	2615-239	100 Ohm 1/2 Watt	1
R121	2615-231	47 Ohm 1/2 Watt	1
R122	2615-245	180 Ohm 1/2 Watt	*
TRANSFORMERS			
T101	4428-507	Oscillator	-
T102	4474-502	Driver	-
T103	4476-601	Output	-
MISCELLANEOUS			
	2475-762	Connector	1

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ELECTRICAL PARTS LIST
LORAIN 4871-024 NO. 2 GENERATOR ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4337-310	Plug-in Card	1
CAPACITORS			
C201	2713-154	.47UF 100 Volt, DC	1
C201	2713-174	1UF 100 Volt, DC	1
C202	2713-218	.01UF 200 Volt	1
C203	2713-227	.047UF 200 Volt	1
C204	2731-142	100UF 12 Volt, Electrolytic	-
C205	2713-325	.1UF 400 Volt	1
C206	2713-227	.047UF 200 Volt	*
C207	2713-325	.1UF 400 Volt	*
C208	2713-339	.47UF 400 Volt	1
DIODES			
CR205	2812-131	1N538, Silicon	1
RESISTORS			
R203	2614-248	240 Ohm 1/2 Watt	1
R204	2614-248	240 Ohm 1/2 Watt	*
R206	2615-303	47K Ohm 1/2 Watt	1
R207	2615-303	47K Ohm 1/2 Watt	*
R208	2651-342	2.25K Ohm 3 Watt	1
R213	2615-463	1K Ohm 1 Watt	1
R214	2651-340	1.8K Ohm 3 Watt	1
R215	2683-354	500 Ohm 2 Watt, Potentiometer	1
R216	2683-362	1.5K Ohm 2 Watt, Potentiometer	1
R217	2681-403	3 Ohm 10 Watt, Variable	1

ELECTRICAL PARTS LIST
LORAIN 4871-024 NO. 2 GENERATOR ASSEMBLY

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
RESISTORS (cont'd)			
R218	2615-239	100 Ohm 1/2 Watt	1
R219	2615-245	180 Ohm 1/2 Watt	1
R220	2615-239	100 Ohm 1/2 Watt	*
R221	2615-231	47 Ohm 1/2 Watt	1
R222	2615-245	180 Ohm 1/2 Watt	*
TRANSFORMERS			
T201	4428-503	Oscillator	-
T202	4474-502	Driver	-
T203	4476-303	Output	-
MISCELLANEOUS			
	2475-762	Connector	1

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ELECTRICAL PARTS LIST
LORAIN 4871-025 NO. 3 GENERATOR ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4337-310	Plug-in Card	1
CAPACITORS			
C301	2713-174	1UF 100 Volt	1
C302	2713-218	.01UF 200 Volt	1
C303	2713-227	.047UF 200 Volt	1
C304	2731-142	100UF 12 Volt, Electrolyitc	-
C305	2713-325	.1UF 400 Volt	1
C306	2713-227	.047UF 200 Volt	*
C307	2713-325	.1UF 400 Volt	*
C308	2713-339	.47UF 400 Volt	1
DIODES			
CR305	2812-131	1N538, Silicon	1
RESISTORS			
R303	2614-250	300 Ohm .5 Watt, Fixed	1
R304	2614-250	300 Ohm .5 Watt, Fixed	*
R306	2615-303	47K Ohm .5 Watt, Fixed	1
R307	2615-303	47K Ohm .5 Watt	*
R308	2651-342	2.25K Ohm 3 Watt, Fixed	1
R313	2615-463	1K Ohm 1 Watt, Fixed	1
R314	2651-340	1.8K Ohm 3 Watt, Fixed	1
R315	2683-354	500 Ohm 2 Watt, Variable	1
R316	2683-362	1.5K Ohm 2 Watt, Variable	1
R317	2681-403	3 Ohm 10 Watt, Adjustable	1
R318	2615-239	100 Ohm .5 Watt, Fixed	1

ELECTRICAL PARTS LIST
LORAIN 4871-025 NO. 3 GENERATOR ASSEMBLY

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
RESISTORS (cont'd)			
R319	2615-245	180 Ohm .5 Watt, Fixed	1
R320	2615-239	100 Ohm .5 Watt, Fixed	*
R321	2615-231	47 Ohm .5 Watt, Fixed	1
R322	2615-245	180 Ohm .5 Watt, Fixed	*
TRANSFORMERS			
T301	4428-504	Oscillator	-
T302	4474-502	Driver	-
T303	4476-303	Output	-
MISCELLANEOUS			
	2475-762	Connector	1

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ELECTRICAL PARTS LIST
LORAIN 4871-026 NO. 4 GENERATOR ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4337-310	Plug-in Card	1
CAPACITORS			
C401	2713-162	.68UF 100 Volt	1
C402	2713-218	.01UF 200 Volt	1
C403	2713-227	.047UF 200 Volt	1
C404	2731-142	100UF 12 Volt, Electrolytic	-
C405	2713-325	.1UF 400 Volt	1
C406	2713-227	.047UF 200 Volt	*
C407	2713-325	.1UF 400 Volt	*
C408	2713-325	.1UF 400 Volt	*
DIODES			
CR405	2812-131	1N538, Silicon	1
RESISTORS			
R403	2614-250	300 Ohm 1/2 Watt	1
R404	2614-250	300 Ohm 1/2 Watt	*
R406	2615-303	47K Ohm 1/2 Watt	1
R407	2615-303	47K Ohm 1/2 Watt	*
R408	2651-342	2.25K Ohm 3 Watt	1
R413	2615-463	1K Ohm 1 Watt	1
R414	2651-340	1.8K Ohm 3 Watt	1
R415	2683-354	500 Ohm 2 Watt, Potentiometer	1
R416	2683-362	1,5K Ohm 2 Watt, Potentiometer	1
R417	2681-403	3 Ohm 10 Watt	1
R418	2615-239	100 Ohm 1/2 Watt	1

ELECTRICAL PARTS LIST
LORAIN 4871-026 NO. 4 GENERATOR ASSEMBLY

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
RESISTORS (cont'd)			
R419	2615-245	180 Ohm 1/2 Watt	1
R420	2615-239	100 Ohm 1/2 Watt	*
R421	2615-231	47 Ohm 1/2 Watt	1
R422	2615-245	180 Ohm 1/2 Watt	*
TRANSFORMERS			
T401	4428-505	Oscillator	-
T402	4474-502	Driver	-
T403	4476-301	Output	-
MISCELLANEOUS			
	2475-762	Connector	1

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ELECTRICAL PARTS LIST
LORAIN 4871-027 NO. 5 GENERATOR ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4337-310	Plug-in Card	1
CAPACITORS			
C501	2713-154	.47UF 100 Volt, DC	1
C502	2713-218	.01UF 200 Volt	1
C503	2713-218	.01UF 200 Volt	*
C504	2731-142	100UF 12 Volt, Electrolytic	-
C505	2713-325	.1UF 400 Volt	1
C506	2713-227	.047UF 200 Volt	1
C507	2713-325	.1UF 400 Volt	*
C508	2713-325	.1UF 400 Volt	*
DIODES			
CR505	2812-131	1N538, Silicon	1
RESISTORS			
R503	2614-252	360 Ohm 1/2 Watt	1
R504	2614-252	360 Ohm 1/2 Watt	*
R506	2615-303	47K Ohm 1/2 Watt	1
R507	2615-303	47K Ohm 1/2 Watt	*
R508	2651-342	2.25K Ohm 3 Watt	1
R513	2615-463	1K Ohm 1 Watt	1
R514	2651-340	1.8K Ohm 3 Watt	1
R515	2683-354	500 Ohm 2 Watt, Potentiometer	1
R516	2683-362	1.5K Ohm 2 Watt, Potentiometer	1
R517	2681-403	3 Ohm 10 Watt	1

ELECTRICAL PARTS LIST
LORAIN 4871-027 NO. 5 GENERATOR ASSEMBLY

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
RESISTORS (cont'd)			
R518	2615-239	100 Ohm 1/2 Watt	1
R519	2615-245	180 Ohm 1/2 Watt	1
R520	2615-239	100 Ohm 1/2 Watt	*
R521	2615-231	47 Ohm 1/2 Watt	1
R522	2615-245	180 Ohm 1/2 Watt	*
TRANSFORMERS			
T501	4428-512	Oscillator	-
T502	4474-502	Driver	-
T503	4476-301	Output	-
MISCELLANEOUS			
	2475-762	Connector	1

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ELECTRICAL PARTS LIST
LORAIN 4871-306 TONE AND FILTER ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4815-004	Component Board	**
CAPACITORS			
C601	2715-261	.5UF	1
C602	2731-108	20UF 50 Volt, Electrolytic	-
C603	2715-249	.1UF 200 Volt	1
C604	2731-208	800UF 75 Volt, Electrolytic	-
DIODES			
CR601	2812-131	1N538, Silicon	2
CR602	2812-131	1N538, Silicon	*
CR603	2812-131	1N538, Silicon	*
CR605	2811-204	1N 118A - 1N 270* JJH 10-16-97	1
FUSES			
F601	2483-215	.50 Amp, Cartridge	3
INDUCTORS			
L601	4413-502	Output	-
RESISTORS			
R601	2615-263	1K Ohm .5 Watt, Fixed	1
R603	2615-231	47 Ohm .5 Watt, Fixed	1
R604	2615-279	4.7K Ohm .5 Watt, Fixed	1
R605	2615-281	5.6K Ohm .5 Watt, Fixed	1
R606	2652-322	200 Ohm 10 Watt, Fixed	1
R608	2614-255	470 Ohm .5 Watt, Fixed	1

ONE UNIT *

CAUTION CHANGES HAVE BEEN MADE ON THIS PAGE SEE ISSUE SHEET 02/07/94

ELECTRICAL PARTS LIST
LORAIN 4871-306 TONE AND FILTER ASSEMBLY

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
TRANSFORMERS			
T601	4457-502	Oscillator Tone Inductor	-
T602	4455-005	Output Tone	-
TRANSISTORS			
Q1	2847-100	2N526	1
Q602	2848-064	5 Amp, PNP	1
MISCELLANEOUS			
	2488-106	Fuseholder	1
	2868-105	Socket, Power Transistor	1

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ELECTRICAL PARTS LIST
LORAIN 4815-004 COMPONENT BOARD ASSEMBLY

The quantity of spare parts (except fuses) listed should be sufficient for ten or less COMPONENT BOARD ASSEMBLIES for at least 18 months.

Ref. Desig.	LPC Part No.	Description	Quantity Rec. Spares
RESISTORS			
R607	2683-354	500 Ohm 2W, Variable	1

LORAIN PRODUCTS CORP.
Lorain, Ohio
July 17, 1968

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lhs

NO			DATE	
14	13057	3		REDRAWN, WAS "E" SIZE.
	G. SOBOTKA	28		NO PHYSICAL CHANGE
15	14758	12		Q101 2 3 4 & Q601 2
		14		WERE 29WH 2N3811 /
		65		2N1414. CR601, 604, 205, 105, 305, 405, 505, WERE 76WG (IN537)
16	14783	2		F101, 201, 301, 401,
		21		501 WERE 13M
		66		REVISION OF 155 15 DELETED
17	16105	3		Q101,2,3,4,5 Q601,2
		21		WERE 29WH (2N3811 / 2N1414) CR601 604, 205,105,305,405,505 WERE 76WG (IN537)
		66		
18	18947	12		C108,208 AND 308 WERE
		19		2713-338
		68		
19	1831023	8		V ON T602 TERM 5
		17		WAS Y

T501 R506 C501 R503 C502 C503 R501 R504 R507 R508 R509 R510 R511 R512 R513 R514 R519 C506 R518 C505 R520 C507 R521 C508 R522 F501 T502 T503 Q101 Q102 Q103 Q104 Q105 Q506 Q507 Q508 Q509 CR103 CR104 CR505 CR102 CR101 R102 R109 R111 R112 R110 R105 C110 R515 R516 R517 C504 C509

9VAC SEE NOTE 105

GENERATOR NO 5
4871-027

4337-310
SEMICONDUCTOR ASSY.

TEST JACK

TO SHEET 2

FREQ NO 1
FREQ NO 2
FREQ NO 3
FREQ NO 4
FREQ NO 5
PARALLELING NO 1
PARALLELING NO 2
PARALLELING NO 3
PARALLELING NO 4
PARALLELING NO 5
TONE
REMOTE START
P B (NOTE 106)
BAT (−)
GRD (+)
SEE NOTE 102

NOTES

101. USE (Y) WIRING OPTION WHEN REMOTE START RELAY IS PROVIDED.
102. OPTIONAL FRAME GROUND FOR PROTECTION AGAINST REVERSE BATTERY POLARITY.
103. FULL LOAD INPUT CURRENT IS APPROX 3 AMP
104. TEST VOLTAGES: AC VOLTAGES MEASURED WITH 5,000 OHM/VOLT RECTIFIER TYPE AC VOLTMETER. DC VOLTAGES MEASURED WITH 20,000 OHM/VOLT DC VOLTMETER. ALL READINGS ACCURATE WITHIN ± 10%, NOMINAL INPUT VOLTAGE NO LOAD OUTPUT UNLESS OTHERWISE SPECIFIED.
105. USE METER HAVING INTERNAL IMPEDANCE OF 250,000 OHMS OR GREATER
106. TERM. 6 SUPPLIES REMOTE CONTROLLED BAT. FOR POWER BOOSTER WHEN REMOTE START RELAY IS PROVIDED
107.

SPEC NO.	DESCRIPTION
5125-001	5 GENERATORS AND TONE AND FILTER UNIT AS SHOWN.
5125-002	SAME AS 5125-001 OMITTING GENERATOR #1.
5125-003	SAME AS 5125-001 OMITTING GENERATOR #2.
5125-004	SAME AS 5125-001 OMITTING GENERATOR #5.
5125-005	SAME AS 5125 001 EXCEPT GENERATOR #2 IS 4871-021 (20~ ONLY) SCHEMATIC DIAGRAM AND TEST VOLTAGES SAME AS 4871-023
5125-006	SAME AS 5125-001 OMITTING GENERATOR #3
5125-007	GENERATORS #1 AND #2 SAME AS 5125-001, GENERATOR #3 IS 4871-024, GENERATOR #4 IS 4871-023
5125-008	SAME AS 5125-001 OMITTING GENERATORS #2,3,4,5
5125-009	SAME AS 5125-001 OMITTING TONE AND FILTER UNIT.
5125-010	SAME AS 5125-001 OMITTING GENERATOR #2 AND #4 AND TONE AND FILTER UNIT.
5125-011	GENERATORS #2 AND #3 ARE 4871-024, GENERATORS #4 AND #5 ARE 4871-026 TONE AND FILTER UNIT PROVIDED.
5125-012	SAME AS 5125-001 OMITTING GENERATORS #2,3,4.

AUDIBLE RINGING TONE GENERATOR

TO GEN NO.1 OR NO.2

CR602 CR603 R607 R601 R608 T601 C601 CR605 Q601 R603 R604 C603 Q602 CR601 T602 R605 R606 C602 C604 F601 L601 4845-709 (OPTIONAL) K601 CR604

COMMON UNIT 4871-306

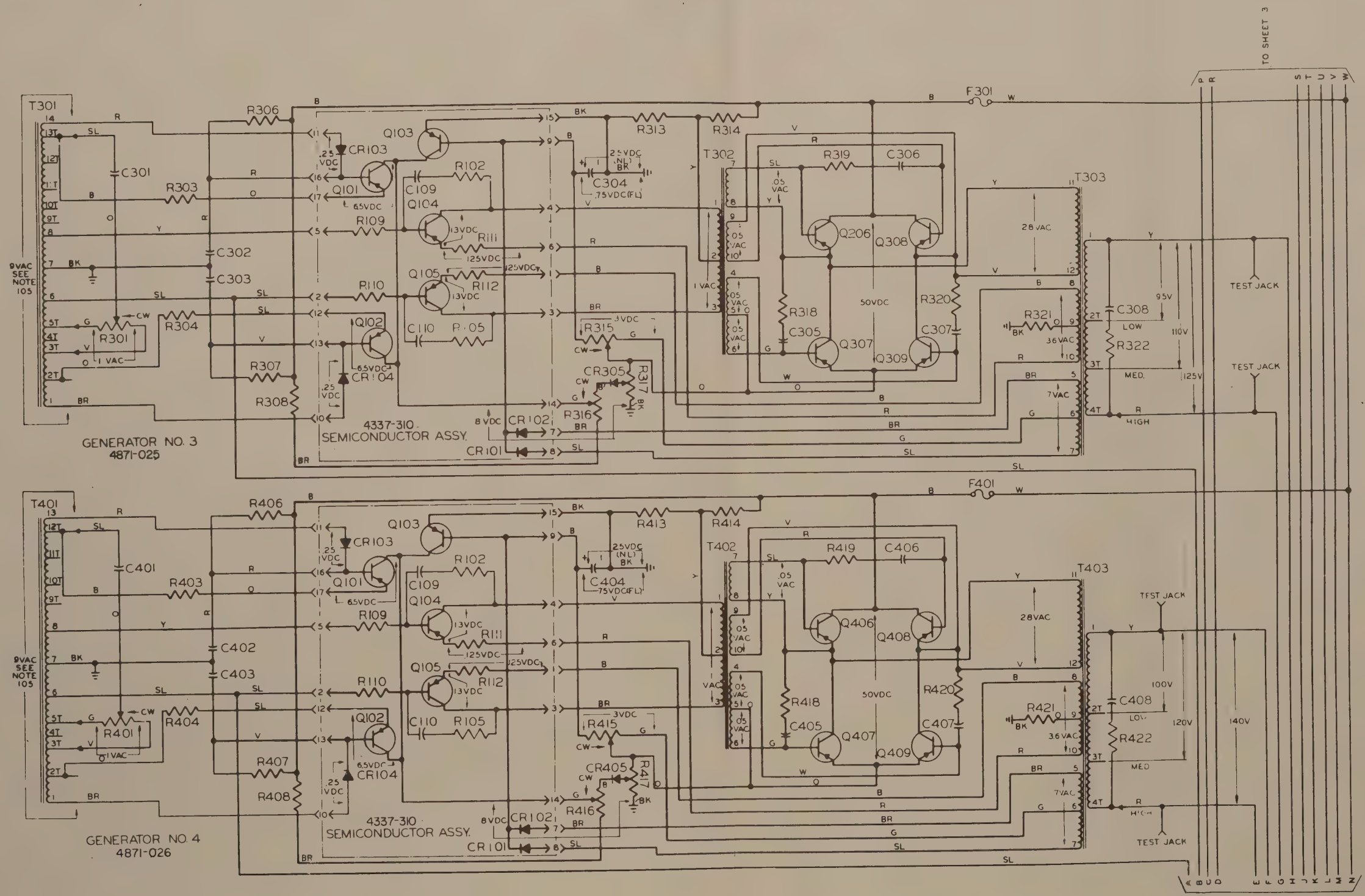
CAUTION
CHANGES HAVE BEEN
* ON THIS PAGE
SEE ISSUE SHEET

WAS 80-4438-01

SCHEMATIC DIAGRAM
FOR
MODEL LT15R

LORAIN Products Corporation
LORAIN, OHIO

DRM	9-15-61	SD 5125 002 THRU	
DRD	9-18-61	SD 5125 012	
DNK	11-29-61		
DWH	12-14-61		



CODE IDENT NO 74006	SIZE D	SD-5125-012 THRU SD-5125-001	ISSUE 14
SCALE		SHEET 2 OF 4	

CODE IDENT NO	SIZE	SD-5125-012 THRU SD-5125-001
74006	D	

SHEET 3 OF 4

ISSUE 19

TO SHEET 2

GENERATOR NO. 2
4871-024

GENERATOR NO. 1
4871-023

4337-310
SEMICONDUCTOR ASSY.

TO AUDIBLE RINGING TONE GEN (LTI5A ONLY)

TO AUDIBLE RINGING TONE GEN (ALL MODELS EXCEPT LTI5A)

TEST JACK

HIGH

MED

LOW

110V

97V

85V

25V

28VAC

50VDC

36VAC

7VAC

1VAC

.05VAC

.75VDC (FL)

2.5VDC (NL)

25VDC

13VDC

6.5VDC

2.5 VDC

9VAC SEE NOTE 103

T103

T102

T101

T201

F201

F101

Q101 Q102 Q103 Q104 Q105 Q106 Q107 Q108 Q109 Q201 Q202 Q203 Q204 Q205 Q206 Q207 Q208

CR101 CR102 CR103 CR104

C101 C102 C103 C104 C105 C106 C107 C108 C109 C110 C201 C202 C203 C204 C205 C206 C207 C208

R101 R102 R103 R104 R105 R106 R107 R108 R109 R110 R111 R112 R113 R114 R115 R116 R117 R118 R119 R120 R121 R122 R201 R202 R203 R204 R205 R206 R207 R208 R209 R210 R211 R212 R213 R214 R215 R216 R217 R218 R219 R220 R221 R222

PARTS LIST

NOTE 202 DESIGNATION								PT. NO	DESCRIPTION
4871-021	4871-023	4871-024	4871-025	4871-026	4871-027	4871-306	4337-310		
GEN2	GEN1	GEN2	GEN3	GEN4	GEN5	COM	SEMI		
C201	C101							2713-154 2713-174 (2)	.47 MF ± 10% 100V CAPACITOR 1 MF ± 10% 100V CAPACITOR
		C201						2713-154 2713-174	.47 MF ± 10% 100V CAPACITOR 1 MF ± 10% 100V CAPACITOR
			C301					2713-174	1 MF ± 10% 100V CAPACITOR
				C401				2713-162	.68 MF ± 10% 100V CAPACITOR
					C501			2713-154	4.7 MF ± 10% 100V CAPACITOR
						C601		2715-261	5 MF 200V CAPACITOR
C202	C102	C202	C302	C402	C 02			2713-218	.01 MF 200V CAPACITOR
						C602		2731-108	20 MF 50V ELECTROLYTIC CAPACITOR
C203	C103	C203	C303	C403				2713-227	.047 200V CAPACITOR
					C503			2713-218	.01 MF 200V CAPACITOR
						C603		2715-249	.1 MF 200V CAPACITOR
C204	C104	C204	C304	C404	C504			2731-142	100 MF 12V ELECTROLYTIC CAPACITOR
						C604		2731-208	800 MF 75V ELECTROLYTIC CAPACITOR
C205	C105	C205	C305	C405	C505			2713-325	.1 MF 400V CAPACITOR
C206	C106	C206	C306	C406	C506			2713-227	.047 MF 200V CAPACITOR
C207	C107	C207	C307	C407	C507			2713-325	.1 MF 400V CAPACITOR
C208	C108	C208	C308					2713-339	.47 MF 400V CAPACITOR
				C408	C508			2713-325	.1 MF 400V CAPACITOR
							C109	2713-412	.001 MF 600V CAPACITOR
							C110		.001 MF 600V CAPACITOR
							CR101	2811-411	
							CR102		GERMANIUM DIODE
						CR601		2812-131	SILICON DIODE
						CR602			SILICON DIODE
						CR603			SILICON DIODE
						CR604			SILICON DIODE
							CR103	2811-204	GERMANIUM DIODE
							CR104		GERMANIUM DIODE
						CR605			GERMANIUM DIODE
CR205	CR105	CR205	CR305	CR405	CR505			2812-131	SILICON DIODE
F201	F101	F201	F301	F401	F501			2484-225	1 AMP MDL FUSE
						F601		2484-215	1/2 AMP AGC FUSE
						K601		2542-502	48V 15AMP
						L601		4413-502	INPUT FILTER CHOKE
						Q601	Q101	2847-100	TRANSISTOR
							Q102		TRANSISTOR
						Q602		2848-064	TRANSISTOR
							Q103	2847-100	TRANSISTOR
							Q104		TRANSISTOR
							Q105		TRANSISTOR
Q206	Q106	Q206	Q306	Q406	Q506			2848-064	TRANSISTOR
Q207	Q107	Q207	Q307	Q407	Q507				TRANSISTOR
Q208	Q108	Q208	Q308	Q408	Q508				TRANSISTOR
Q209	Q109	Q209	Q309	Q409	Q509				TRANSISTOR
T201	T101							4428-507	OSCILLATOR TRANSFORMER
		T201						4428-503	OSCILLATOR TRANSFORMER
			T301					4428-504	OSCILLATOR TRANSFORMER
				T401				4428-505	OSCILLATOR TRANSFORMER
					T501			4428-512	OSCILLATOR TRANSFORMER
						T601		4457-502	TONE OSCILLATOR INDUCTOR
T202	T102	T202	T302	T402	T502			4474-502	DRIVER TRANSFORMER
						T602		4455-005	TONE OUTPUT TRANSFORMER
	T103							4476-601	OUTPUT TRANSFORMER
		T203	T303					4476-303	OUTPUT TRANSFORMER
				T403	T503			4476-301	OUTPUT TRANSFORMER
T203									OUTPUT TRANSFORMER

R201	R101	R201	R301	R401	R501			2683-255	500 OHM 2 WATT WIREWOUND POT
						R601		2615-263	1000 OHM RESISTOR
							R102	2615-287	10000 OHM RESISTOR
R203	R103							2614-247	220 OHM 1/2 WATT 5% CARBON RESISTOR
		R203						2614-248	240 OHM 1/2 WATT 5% CARBON RESISTOR
			R303	R403				2614-250	300 OHM 1/2 WATT 5% CARBON RESISTOR
					R503			2614-252	360 OHM 1/2 WATT 5% CARBON RESISTOR
						R603		2615-231	47 OHM RESISTOR
R204	R104							2614-247	220 OHM 1/2 WATT 5% CARBON RESISTOR
		R204						2614-248	240 OHM 1/2 WATT 5% CARBON RESISTOR
			R304	R404				2614-250	300 OHM 1/2 WATT 5% CARBON RESISTOR
					R504			2614-252	360 OHM 1/2 WATT 5% CARBON RESISTOR
						R604		2615-279	4700 OHM RESISTOR
							R105	2615-287	10000 OHM RESISTOR
						R605		2615-281	5600 OHM RESISTOR
R206	R106	R206	R306	R406	R506			2615-303	47000 OHM RESISTOR
						R606		2652-322	200 OHM 10 WATT WIREWOUND RESISTOR
R207	R107	R207	R307	R407	R507			2615-303	47000 OHM RESISTOR
						R607		2683-354	500 OHM 2 WATT WIREWOUND POT.
R208	R108	R208	R308	R408	R508			2651-342	2250 OHM 3 WATT WIREWOUND RESISTOR
							R109	2615-263	1000 OHM RESISTOR
							R110		1000 OHM RESISTOR
							R111	2615-231	47 OHM RESISTOR
							R112		47 OHM RESISTOR
R213	R113	R213	R313	R413	R513			2615-463	1000 OHM 1 WATT CARBON RESISTOR
R214	R114	R214	R314	R414	R514			2651-340	1800 OHM 3 WATT WIREWOUND RESISTOR
R215	R115	R215	R315	R415	R515			2683-354	500 OHM 2 WATT WIREWOUND POT.
R216	R116	R216	R316	R416	R516			2683-362	1500 OHM 2 WATT WIREWOUND POT.
R217	R117	R217	R317	R417	R517			2681-403	3 OHM 10 WATT DIVIDOHM
R218	R118	R218	R318	R418	R518			2615-239	100 OHM RESISTOR
R219	R119	R219	R319	R419	R519			2615-245	180 OHM RESISTOR
R220	R120	R220	R320	R420	R520			2615-239	100 OHM RESISTOR
R221	R121	R221	R321	R421	R521			2615-231	47 OHM RESISTOR
R222	R122	R222	R322	R422	R522			2615-245	180 OHM RESISTOR
						R608		2614-255	470 OHM RESISTOR

NOTE:

201. ALL RESISTORS ARE 1/2 WATT ±10% CARBON UNLESS OTHERWISE SPECIFIED.

202. ALTERNATE GEN. #2 (4871-021) IS 20 ∿ ONLY

ISSUE

CODE IDENT NO	SIZE	
74006	D	SD-5125-012 THRU SD-5125-001
ALL		SHEET 4 OF 4

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REVISIONS				
ZONE	SYMBOL	DESCRIPTION	DATE	APPROVAL
	ISS.1 8390	REDRAWN NO CKT. CHG.	11-2-62 WB	
	ISS.2 9340	NOTE REMOVED DL	4-9-63	
		CH'd 4-9-63 NK 4-9-63		pwd 4-9-63
	ISS.3 9688	C101 WAS 2.5MF 200V DAV	7-3-63	
		CH'd RH Zahaya 7-3-63 NK 7-5-63 W.H.B. 7-5-63		
	4 10520	WIRES ADDED AND CHG'D E PRATT	11 11 63	
		ch'd B Gibbs 11-11-63 W.B. 11/12/63		
	5 10564	MODEL NUMBER CHANGED A. LESH	11 22 63	
		CH'd Zahaya 11-21-63 W.B. 11/26/63		
	6 10576	R101 WAS 4 WATT A. MUCHA	12 24 63	
		ch'd Zahaya 12/24/63 NK 12-26-63		
	7 19497	LOC 13 REVISED	1 6 70	
		CH'd Mucha 1-14-70		

PLUG-IN TRANSISTOR CARD 4337-310

5

16 TO CHASSIS CONN. SEE TD-1433-12

15 TO TONE GEN. SEE TD-1433-11

14 TO PWR. TRANSISTOR SEE TD-1433-12

T102 4474-502

1

2 R117 500 Ω 10W DIV.

3 R115 500 Ω 2W

4 R116 1500 Ω 2W

6 T103 4476-601

C108 .47MF 400V

R122 180 Ω .5W

7 TEST JACK

8

9 R101 500 Ω 2W FRONT

10 F101

13 (PART) REAR CAP. AND RES CARD

T101 4428-507

12

11

C101 2.5MF 100V

13 (PART) FRONT CAP. AND RES CARD

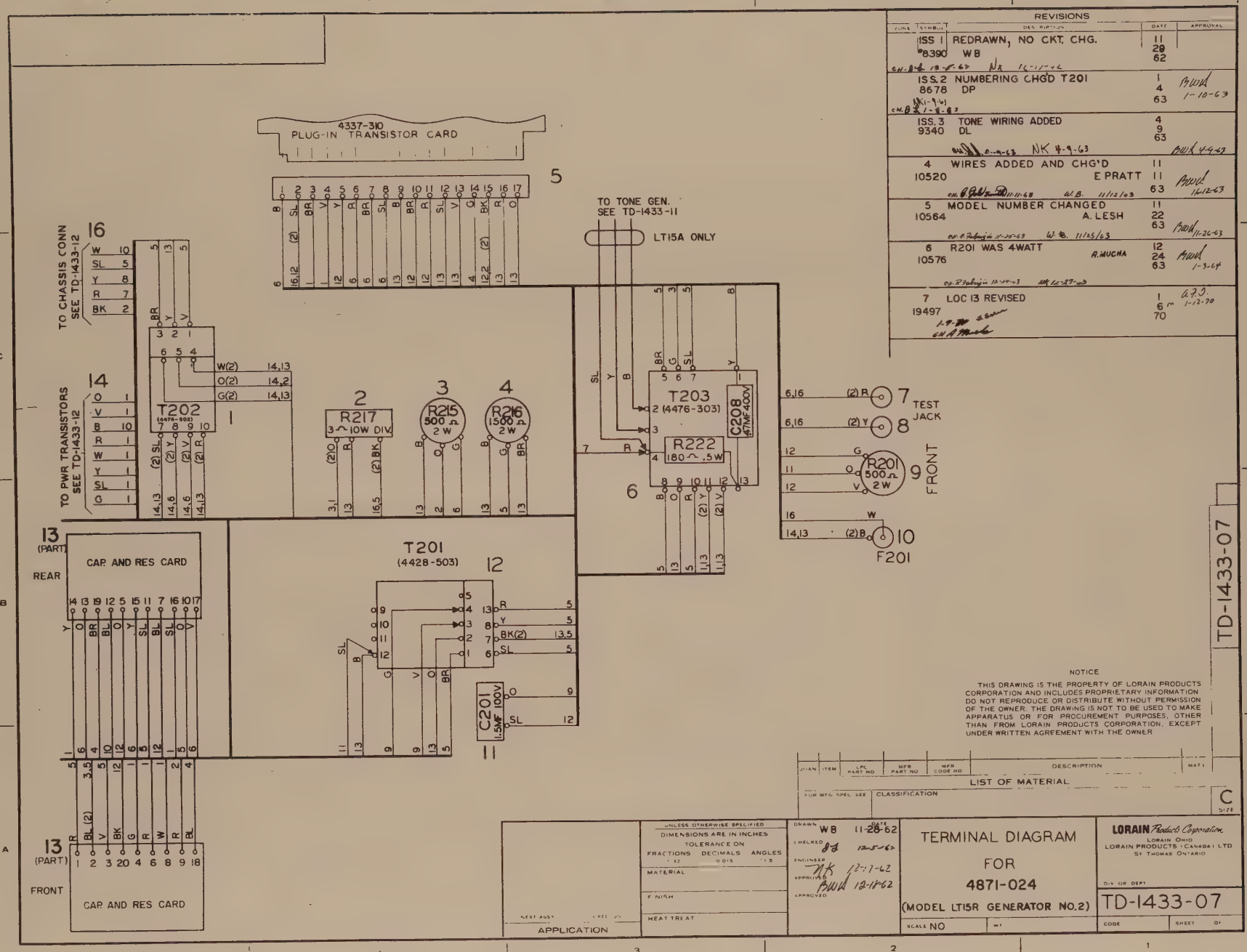
TD-1433-06

QUAN	ITEM	LPC PART NO.	MFR PART NO	MFR CODE NO	DESCRIPTION	MAT'L

LIST OF MATERIAL

FOR MFG SPEC SEE | CLASSIFICATION | C SIZE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCE ON FRACTIONS ±1/32, DECIMALS ±0.015, ANGLES ±1.5°	DRAWN WB 11-2-62	TERMINAL DIAGRAM FOR 4871-023 (MODEL LT15R GENERATOR NO.1)	LORAIN Products Corporation, LORAIN, OHIO, LORAIN PRODUCTS (CANADA) LTD. ST THOMAS ONTARIO
MATERIAL	CHECKED 13-17-62		DIV OR DEPT
FINISH	ENGINEER NK 12-13-62		TD-1433-06
HEAT TREAT	APPROVED 12-14-62		
NEXT ASSY / USED ON: APPLICATION	APPROVED	SCALE NO WT	CODE SHEET OF


REVISIONS
ISS 1 REDRAWN, NO CKT. CHG. 8390 WB 11 20 62
ISS.2 NUMBERING CHG'D T201 8678 DP 1 4 63
ISS. 3 TONE WIRING ADDED 9340 DL 4 9 63
4 WIRES ADDED AND CHG'D 10520 E PRATT 11 63
5 MODEL NUMBER CHANGED 10564 A. LESH 11 22 63
6 R201 WAS 4WATT 10576 A. MUCHA 12 24 63
7 LOC 13 REVISED 19497 1 6 70
4337-310 PLUG-IN TRANSISTOR CARD
TO TONE GEN. SEE TD-1433-11
LT15A ONLY
TO CHASSIS CONN SEE TD-1433-12
TO PWR TRANSISTORS SEE TD-1433-12
T202 (4476-502)
R217 10W DIV
R215 500Ω 2W
R216 1500Ω 2W
T203 (4476-303)
R222 180Ω .5W
C208 .47MF 400V
TEST JACK
R201 500Ω 2W
FRONT
F201
T201 (4428-503)
C201 1.5MF 100V
REAR
CAP AND RES CARD
FRONT
CAP AND RES CARD
NOTICE
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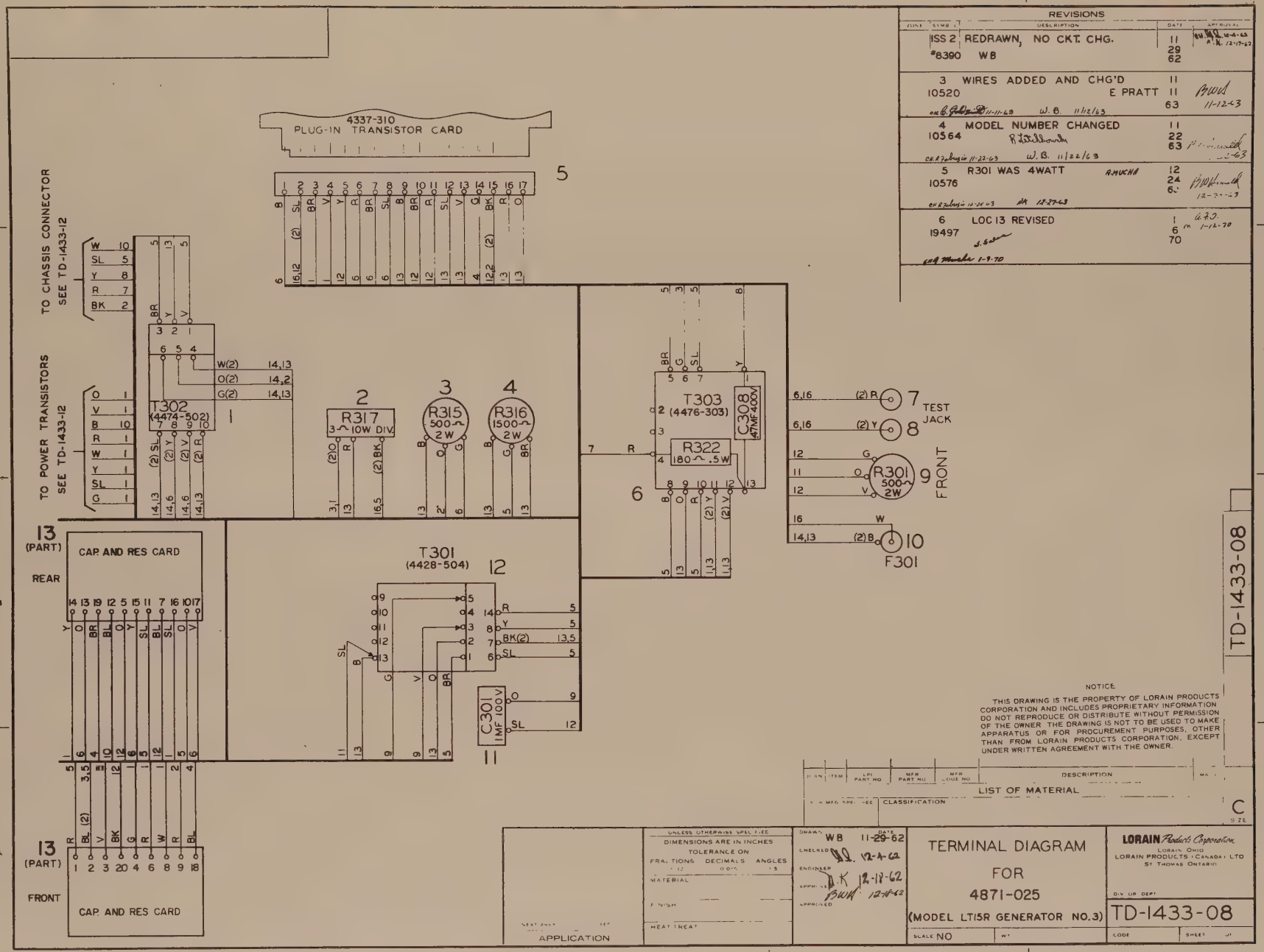
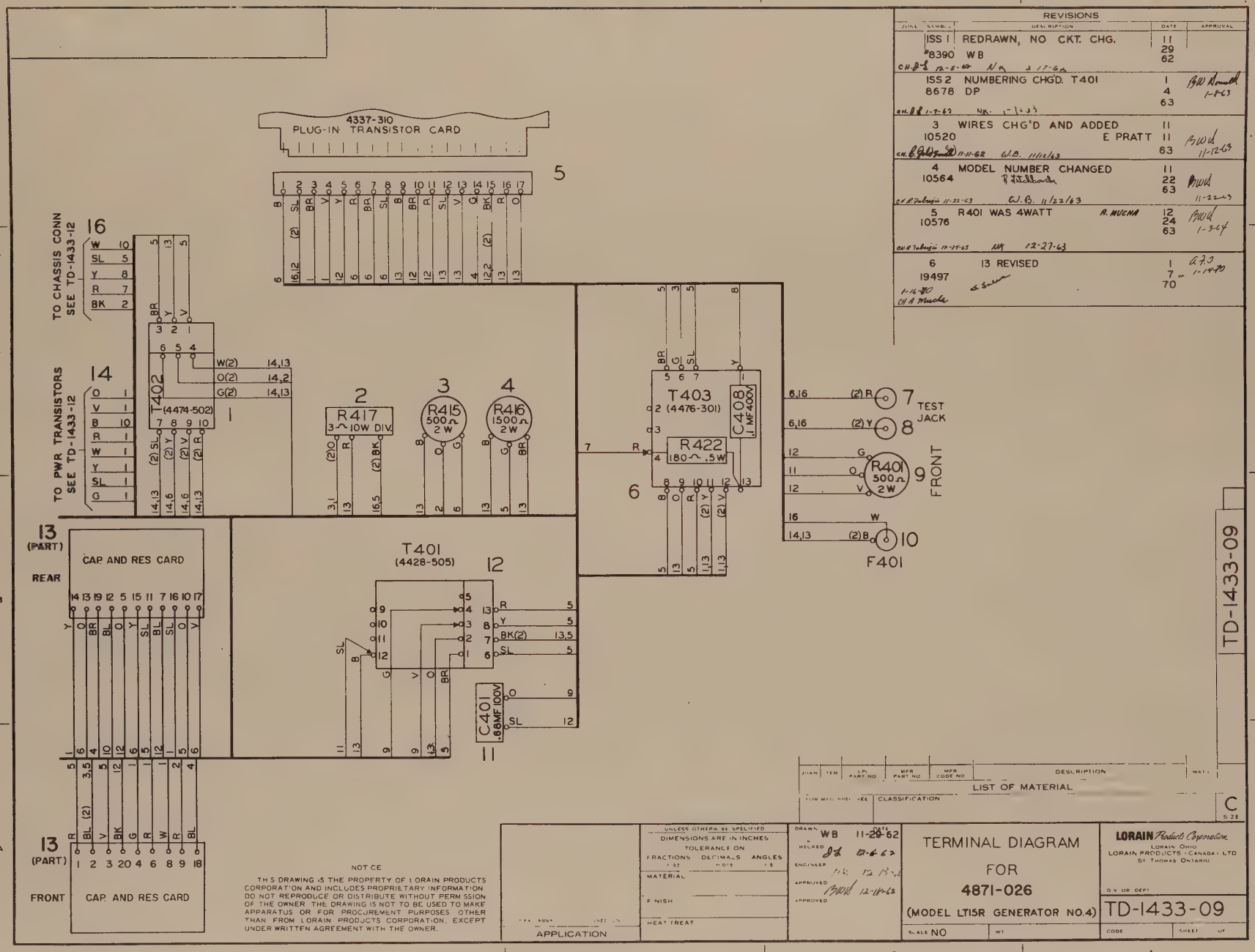
LIST OF MATERIAL
APPLICATION
TERMINAL DIAGRAM FOR 4871-024 (MODEL LT15R GENERATOR NO.2)
LORAIN Products Corporation
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD
ST THOMAS ONTARIO
TD-1433-07
TD-1433-07


REVISIONS
ISS 2 REDRAWN, NO CKT. CHG. #8390 WB 11 29 62
3 WIRES ADDED AND CHG'D 10520 E PRATT 11 63
4 MODEL NUMBER CHANGED 10564 11 22 63
5 R301 WAS 4WATT 10576 12 24 63
6 LOC 13 REVISED 19497 1 6 70
4337-310 PLUG-IN TRANSISTOR CARD
TO CHASSIS CONNECTOR SEE TD-1433-12
TO POWER TRANSISTORS SEE TD-1433-12
T302 (4474-502)
R317 3Ω 10W DIV
R315 500Ω 2W
R316 1500Ω 2W
T303 (4476-303)
C308 .47MF 400V
R322 180Ω .5W
R301 500Ω 2W
TEST JACK
FRONT
F301
T301 (4428-504)
C301 1MF 100V
13 (PART) REAR CAP AND RES CARD
13 (PART) FRONT CAP AND RES CARD
NOTICE
THIS DRAWING IS THE PROPERTY OF LORAIN PRODUCTS CORPORATION AND INCLUDES PROPRIETARY INFORMATION DO NOT REPRODUCE OR DISTRIBUTE WITHOUT PERMISSION OF THE OWNER THE DRAWING IS NOT TO BE USED TO MAKE APPARATUS OR FOR PROCUREMENT PURPOSES, OTHER THAN FROM LORAIN PRODUCTS CORPORATION, EXCEPT UNDER WRITTEN AGREEMENT WITH THE OWNER.
LIST OF MATERIAL
DIMENSIONS ARE IN INCHES
TOLERANCE ON FRACTIONS DECIMALS ANGLES
DRAWN WB 11-29-62
CHECKED 12-4-62
ENGINEER 12-17-62
APPROVED BWH 12-17-62
APPLICATION
TERMINAL DIAGRAM FOR 4871-025 (MODEL LT15R GENERATOR NO.3)
LORAIN Products Corporation
LORAIN PRODUCTS CANADA LTD ST THOMAS ONTARIO
TD-1433-08
SIZE C
SCALE NO
SHEET
TD-1433-08


REVISIONS
ZONE | SYMBOL | DESCRIPTION | DATE | APPROVAL
ISS 1 REDRAWN, NO CKT. CHG. 8390 WB 11 29 62
ISS 2 NUMBERING CHG'D. T401 8678 DP 1 4 63
3 WIRES CHG'D AND ADDED 10520 E PRATT 11 63
4 MODEL NUMBER CHANGED 10564 11 22 63
5 R401 WAS 4WATT 10576 A. MUCHA 12 24 63
6 13 REVISED 19497 1 7 70
4337-310 PLUG-IN TRANSISTOR CARD
5
TO CHASSIS CONN SEE TD-1433-12
16
W 10
SL 5
Y 8
R 7
BK 2
TO PWR TRANSISTORS SEE TD-1433-12
14
T402 (4474-502)
1
2
R417 10W DIV.
3
R415 500Ω 2W
4
R416 1500Ω 2W
T403 (4476-301)
C408 1 MF 400V
R422 180Ω .5W
6
7 TEST JACK
8
9 FRONT
R401 500Ω 2W
10
F401
13 (PART) REAR
CAP AND RES CARD
T401 (4428-505)
12
C401 .68MF 100V
11
13 (PART) FRONT
CAP AND RES CARD
NOTICE
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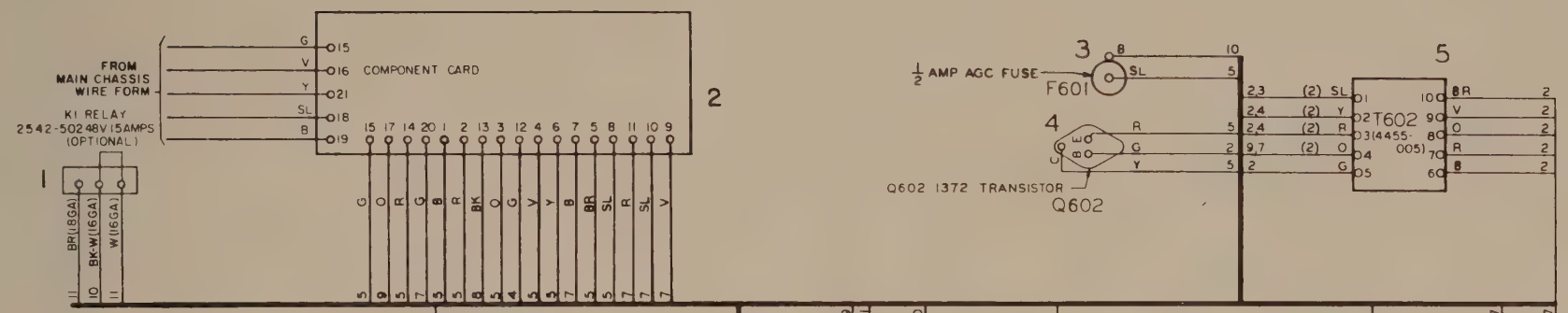
LIST OF MATERIAL
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON FRACTIONS DECIMALS ANGLES
MATERIAL
FINISH
HEAT TREAT
APPLICATION
DRAWN WB 11-29-62
CHECKED 12-6-62
ENGINEER
APPROVED
APPROVED 12-14-62
TERMINAL DIAGRAM FOR 4871-026 (MODEL LT15R GENERATOR NO.4)
LORAIN Products Corporation
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD
ST THOMAS ONTARIO
TD-1433-09
SCALE NO
SHEET
TD-1433-09

ISS	STATUS			
ISS 2	8390	REDRAWN, NO CKT CHG W8		15 62
ISS 3	9307	WIRE ADDED	R J H	3 28 63
ISS 4	10564	MODEL NUMBER CHANGED A LESH		11 25 63
ISS 5	10576	L601 WAS 1288G		12 24 63
ISS 6	19497	LOC 1 MOVED AND LOC 2 REVISED		12 18 69
ISS 7	1831023	V ON TERM. 16 WAS Y		8 17 71



QUAN	ITEM	LPC PART NO	MFR PART NO	MFR CODE NO	DESCRIPTION	MAT'L

LIST OF MATERIAL

FOR MFG SPEC SEE | CLASSIFICATION

NEXT ASSY | USED ON | APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE ON
FRACTIONS | DECIMALS | ANGLES
.132 | .016 | 1.5°
MATERIAL
FINISH
HEAT TREAT

DRAWN W8 11-15-62
CHECKED DJ 11-16-62
ENGINEER
APPROVED 12-1-62
APPROVED BWH 12-17-62

TERMINAL DIAGRAM FOR 4871-306 (MODEL LT15R TONE GEN)

LORAIN Products Corporation
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD
ST. THOMAS, ONTARIO

TD-1433-11

TD-1433-11

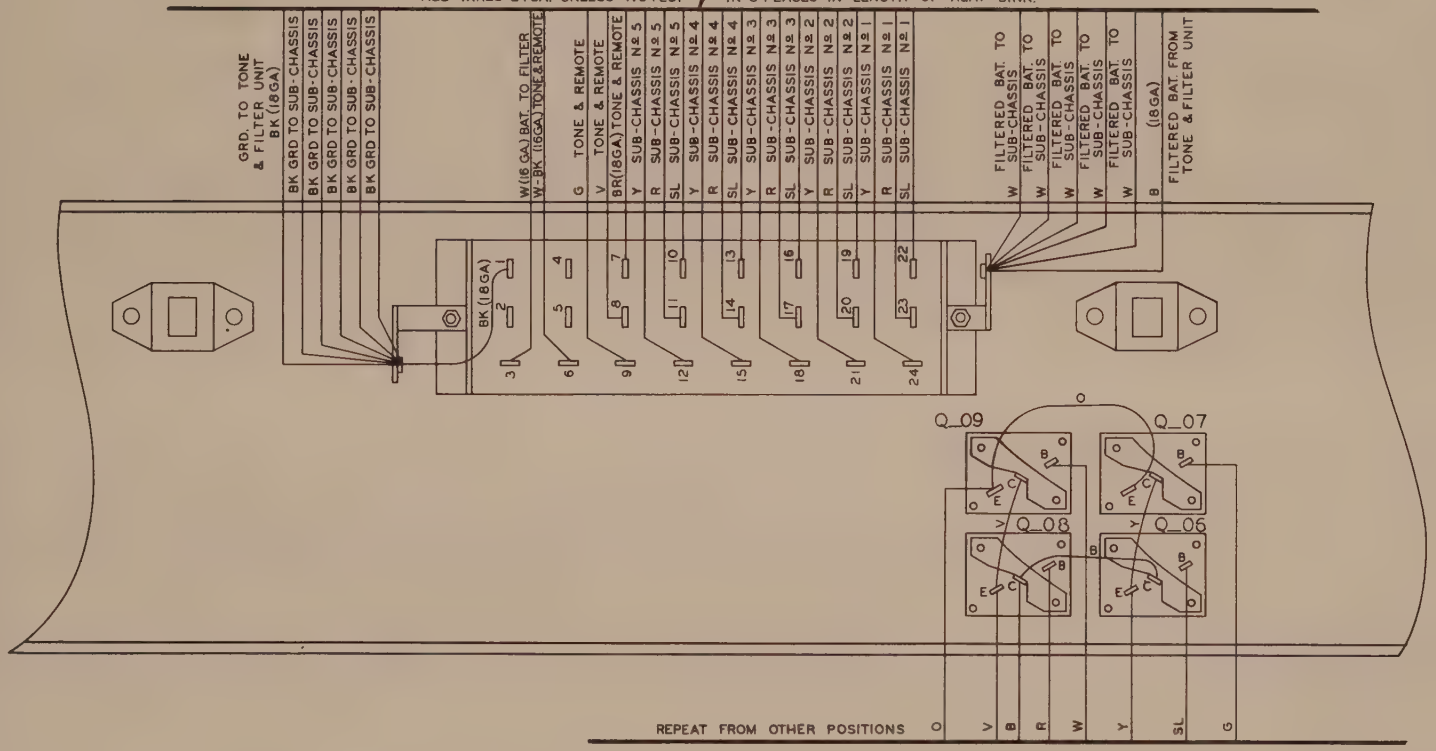
D

TD-1433-12

RE-ISS.	CHANGE SLIP NO.	DWG CHGD BY	DATE	REVISION
1	8390	H B	11 15 62	REDRAWN NO CIRCUIT CHANGE
2	8678	D P	1 3 63	TRANSISTOR SOCKETS RENUMBERED
3	9307	R J H	3 28 63	WIRE ADDED
4	10564	A. L E S H	11 25 63	MODEL NO. CHANGED
5	1831023	B	17 71	V ON TERM. 8 WAS Y, PT. NUMBERS UPDATED

ALL WIRES 24GA. UNLESS NOTED.

AFTER WIRING IS COMPLETE THIS RUN SHALL BE TIED IN 5 PLACES IN LENGTH OF HEAT SINK.


GRD. TO TONE & FILTER UNIT BK (18GA)
BK GRD TO SUB-CHASSIS
BK GRD TO SUB-CHASSIS
BK GRD TO SUB-CHASSIS
BK GRD TO SUB-CHASSIS
BK GRD TO SUB-CHASSIS
W (16 GA) BAT. TO FILTER
W-BK (16GA) TONE & REMOTE
G TONE & REMOTE
V TONE & REMOTE
BR(18GA) TONE & REMOTE
Y SUB-CHASSIS № 5
R SUB-CHASSIS № 5
SL SUB-CHASSIS № 5
Y SUB-CHASSIS № 4
R SUB-CHASSIS № 4
SL SUB-CHASSIS № 4
Y SUB-CHASSIS № 3
R SUB-CHASSIS № 3
SL SUB-CHASSIS № 3
Y SUB-CHASSIS № 2
R SUB-CHASSIS № 2
SL SUB-CHASSIS № 2
Y SUB-CHASSIS № 1
R SUB-CHASSIS № 1
SL SUB-CHASSIS № 1
W FILTERED BAT. TO SUB-CHASSIS
W FILTERED BAT. TO SUB-CHASSIS
W FILTERED BAT. TO SUB-CHASSIS
W FILTERED BAT. TO SUB-CHASSIS
W FILTERED BAT. TO SUB-CHASSIS
B (18GA) FILTERED BAT. FROM TONE & FILTER UNIT
BK (18GA)
Q_09
Q_07
Q_08
Q_06
REPEAT FROM OTHER POSITIONS
O V B R W Y SL G

NOTE:
101. ASSOCIATED PRINTS:

TD-1433-06	4871-023
" " 07	4871-024
" " 08	4871-025
" " 09	4871-026
" " 10	4871-027
" " 15	4871-021
" " 11	4871-306

TERMINAL DIAGRAM FOR MODEL LT15R HEAT SINK

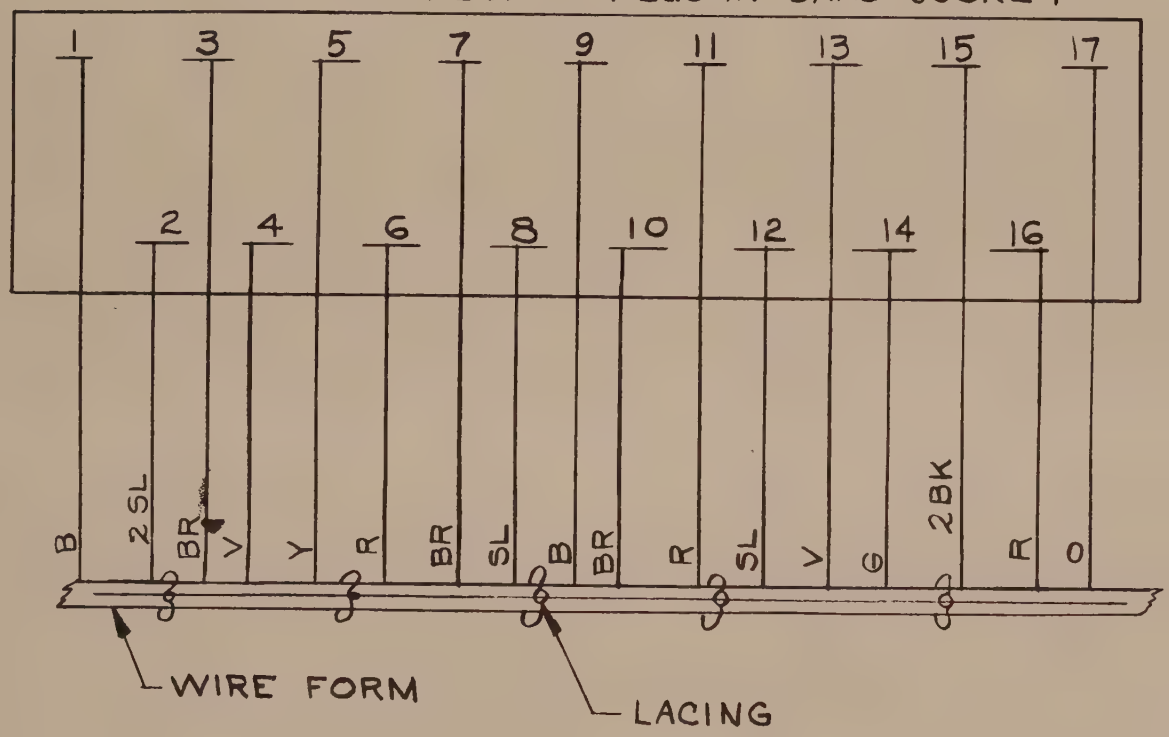
LORAIN Products Corporation
LORAIN, OHIO
AND
LORAIN PRODUCTS (CANADA) LTD. ST. THOMAS, ONTARIO

DR. BY HB	DATE 11-6-62	SCALE	
CK. BY DB	DATE 11-16-62	PART NO.	
CH. BY MK	DATE 12-17-62	TD-1433-12	
APP. BY MWH	DATE 12-17-62		

ISSUE	CHANGE NO.	CHG'D BY	REVISION
1	10564	A. L. E. S. H.	MODEL NO. CHANGED. 11-25-63

11-25-63 CH. R. Pabuzio — W. B. 11/26/63 11-26-63

BOTTOM VIEW OF PLUG-IN CARD SOCKET



WIRING OF PLUG-IN CARD SOCKET FOR MODEL LT15R

LORAIN Products Corporation
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD.
ST. THOMAS, ONTARIO

DRAWN BY R. N.	DATE 11-10-61	PART NO.
CHECKED BY	DATE	SCALE NO
CHECKED BY	DATE	TD1433-13
APPROVED BY	DATE 11-14-63	

GSA
205-200-501

GTE North

TECHNICAL SUPPORT BULLETIN

SUBJECT: 13. MISCELLANEOUS TECHNICAL INDEX - 1989

CONTACT PERSON: KAREN KINSEY — BULLETIN: 13-001F-89

PHONE NUMBER: 219 461-2506 — DATE: 08/24/89

ACTION: ALL — CLASS: INFORMATION

13-001F-89 MISCELLANEOUS TECHNICAL INDEX

13-002-89 BAY BATTERY FILTERS - NOISE

13-003-89 CALIBRATION LABELS FORT WAYNE ESC

13-004-89 GTD-5 LINE FRAME CABLES

13-005-89 SEISCOR T84G TELEPHONE TEST SET

13-006-89 3M-DYNATEL MODEL 573A FAULT LOCATOR LIMITATIONS

13-007-89 RINGING MACHINES, RINGING CONVERTERS, AND COIN BOX BATTERIES, OUTPUT VOLTAGE MEASUREMENTS

13-008-89

13-009-89

13-010-89

GTE North

TECHNICAL SUPPORT BULLETIN

SUBJECT:	RINGING MACHINES, RINGING CONVERTERS, AND COIN BOX BATTERIES, OUTPUT VOLTAGE MEASUREMENTS		
CONTACT PERSON:	ELMER JOHNSON	BULLETIN:	13-007-89
PHONE NUMBER:	219-428-6210	DATE:	07-31-89
ACTION:	ALL	CLASS:	INFORMATION

Change GT&E STANDARD 205-200-501 Table 3, Page 4 of 4 to read as follows:

Modify Table 3 page 4 of 4 to add the following frequencies, 16Hz, 40Hz, and 60 Hz as noted by (*).

Frequency	Volts (+/- 5v)
*16, 16 2/3, or 20 hertz	90
25 or 30 hertz	100
*33 1/3, 40 or 42 hertz	110
50 or 54 hertz	125
*60	130
66 2/3 or 66 hertz	140

The input voltage for the LT15 ring generator during calibration should be 52.5 volts d.c. This voltage closely follows the normal office voltage of most central offices. If calibration is done on this generator with the input voltages set at 52.5 volts, then the unit should have the proper output voltage when connected to the central office battery in the field.

Any questions should be directed to Don Voelker at 428-6259.

See attachments to answer some of your questions.

CAUTION
CHANGES HAVE BEEN MADE
ON THIS PAGE.
SEE ISSUE SHEET. 02/07/94

RINGING MACHINES, RINGING CONVERTERS AND COIN BOX BATTERIES OUTPUT VOLTAGE MEASUREMENTS

CONTENTS

		PAGE
1.	GENERAL	1
2.	TEST APPARATUS	1
3.	ROTARY RINGING MACHINE VOLTAGE TEST	1
4.	COIN BOX COLLECT AND REFUND VOLTAGE TEST	3
	Generators	3
	Rectifiers	3
5.	MULTIFREQUENCY RINGING CONVERTER (VIBRATOR) VOLTAGE TEST	3
6.	TRANSISTOR TYPE RINGING EQUIPMENT VOLTAGE TEST	3
7.	REPORTS	4

1. GENERAL

1.01 This Section presents a procedure for measuring output voltages used for ringing current, and coin box collect and refund battery.

1.02 This Section is being reissued to make changes in wording and format, and to include information on ringing machines with permanent magnet rotors, and transistor type ringing equipment. Because the changes are extensive, marginal arrows will not be used. Remove and destroy Issue 1 of this Section.

1.03 The tests are:

(a) Rotary Ring Machine Voltage Test.

(b) Coin Box Collect and Refund Voltage Test.

(c) Multifrequency Ringing Converter (Vibrator) Voltage Test.

(d) Transistor Type Ringing Equipment Voltage Test.

1.04 Voltages for individual pieces of equipment may vary somewhat from readings given in the Tables in this section. Always obtain the manufacturer's manual and/or GSP section for the equipment to be tested.

1.05 General precautions to be observed whe working around ringing equipment are outlined in the GSP 200-001 series.

2. TEST APPARATUS

2.01 Provide test apparatus as follows;

(a) AC Voltmeter, Weston Model 904 (300V scale) or equivalent.

(b) DC Voltmeter, Weston Model 931 (150V scale) or equivalent.

3. ROTARY RINGING MACHINE VOLTAGE TEST

3.01 Connect the ringing machine to be tested so that it is running and supplying the office load.

3.02 If provided, use the power board meter for taking voltage readings. If no power board meter is provided, use a Weston Model 904 AC Voltmeter or equivalent. Connect test leads to the voltmeter and take voltage measurements at the power board frequency meter.

3.03 The voltmeter should indicate the voltages shown in Table 1 for each particular frequency. (Refer to Paragraph 1.04)

Table 1. Output Voltage Readings for Rotary Ringing Machines.

Frequency	Volts (± 5)
16-2/3~ or 20~	105 V
25~, 30~, 33-1/3~ or 42~	130 V
50~ or 54~	155 V
66~ or 66-2/3~	165 V

3.04 A variable resistor is usually connected to the field winding of a ringing machine generator. Output voltage can be varied by increasing or decreasing the resistance as required. The 25, 30, 33-1/3 or 66-2/3 hertz generator may be used to provide coin control. It is con-

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nected to a transformer provided with a neutral ground common for measuring 115 volt collect and refund battery.

3.05 For Holtzer Cabot ringing machines having permanent magnet rotors the output voltage adjustment is made by moving output taps on transformers mounted on the frame of the machine. When voltage taps are at the maximum output and the voltage is below tolerances shown in Table 1 it is usually caused by weak magnets in the machine failing to produce enough primary voltage to the transformer. The weak magnets can be caused by shorts or grounds of the ringing current in the switching equipment overloading the generator. This condition will partially reverse the polarity of the magnets on the rotor.

3.06 The procedure for restoring the permanent magnets is as follows;

(1) Remove the plug connector from the base of the ringing machine for the generator of which the magnets are to be restored.

(2) With the keyway of the generator shaft in each of the positions described in Table 2 in turn, magnetize the generator by applying 600 volts DC to the plug connector of the generator for a period of one-half second duration MAXIMUM.

NOTE: The 600 volt battery, consisting of 12 Eveready B (heavy) #799 batteries, may be obtained from the Outside Plant Department. This battery is normally used in the KS-14103 Test Set for cable breakdown testing.

(3) When charging the magnet with 600 volts dc, use a #30BS gauge copper wire about one foot long in series with the 600 volt source as a fuse. See Figure 1. The wire will melt, breaking the circuit with a minimum of arcing. DO NOT USE A SWITCH TO OPEN THE CIRCUIT.

NOTE: Test for correct polarity in energizing the magnet in the #1 position (top) by restoring the plug to the base, starting the ringing machine, and testing output for increased voltage. If voltage increased, polarity was correct at the plug and should be marked in order to preserve correct polarity for subsequent energizing in positions 2 and 3.

Table 2. Keyway Positions for Restoring Permanent Magnets. See Figure 1 and Paragraph 3.06.

Generator Rotor	Keyway Position 1	Keyway Position 2	Keyway Position 3
2 Pole	Top	40° Clockwise	40° C. Clockwise
4 Pole	Top	20° "	20° "
6 Pole	Top	13° "	13° "
8 Pole	Top	10° "	10° "

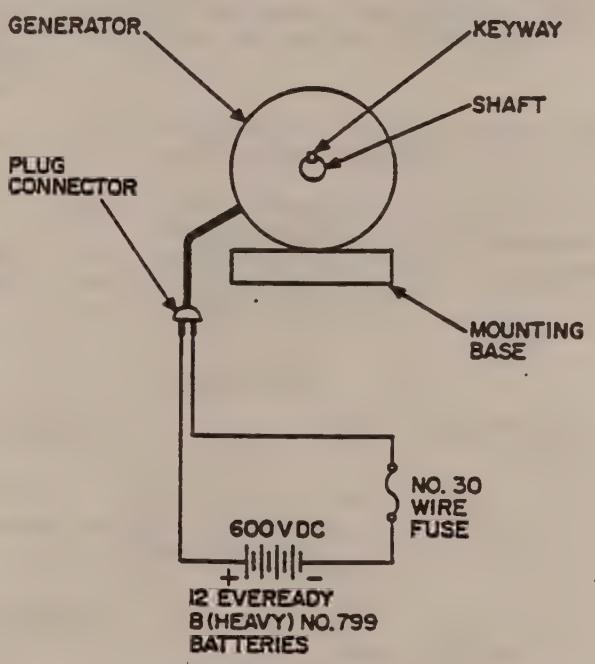

Figure 1. Method of Connecting 600 VDC to Generator Plug Connector. Keyway is Shown in Position 1 (Top).

3.07 After the voltage has been increased on all generators to the point where the lowest taps of each transformer are being used, obtain a 100 ohm wire wound resistor with a slider to be used for stabilizing the magnets. Stabilizing is accomplished by short circuiting the output with various resistances until the voltage of all frequencies is within tolerances shown in Table 1. Start with a resistance of about 100 ohms and

decrease resistance in steps of about 10 ohms each time short is applied until the voltage meets requirements.

NOTE: The machine MUST be running at FULL rated speed when above operation is performed.

3.08 Transfer the load to the ringing machine on which the voltage has been corrected. Proceed with correction of the other machine if necessary.

4. COIN BOX COLLECT AND REFUND VOLTAGE TEST

4.01 Coin box collect and refund battery may be supplied by a generator, dry cell battery, or rectifier.

Generators

4.02 Connect the Weston 931 Voltmeter as shown in Figure 2. Use the 150V scale. Take a voltage reading at the distribution fuse to ground. The voltmeter should indicate 115 to 130 volts.

4.03 To adjust a dc generator to voltage requirements, adjust the field resistor.

Rectifiers

4.04 To adjust a rectifier to voltage requirements move the transformer taps or resistance as required.

5. MULTIFREQUENCY RINGING CONVERTER (VIBRATOR) VOLTAGE TEST

5.01 The ringing converter to be tested should not be supplying the office load. Connect a 5000 ohm shunt resistor across the leads of the Weston 904 AC Voltmeter.

5.02 Measure voltage output at power board output terminals. The meter should indicate 110 to 125 volts for converters connected to either a D-9559 transformer or D-9560 transformer. The meter should indicate 135 to 160 volts when a converter is connected to a D-9594 transformer.

5.03 To adjust a ringing converter to voltage requirements, turn the contact screws, then recheck tension and frequency requirements. Refer to the appropriate section in the GSP 205-210 series for methods of adjustment.

6. TRANSISTOR TYPE RINGING EQUIPMENT VOLTAGE TEST

6.01 To check the output of transistorized ringing equipment connect an incandescent lamp, of a wattage equivalent to the output capacity of the ringing equipment, across the OUTPUT TEST jacks for the frequency to be tested.

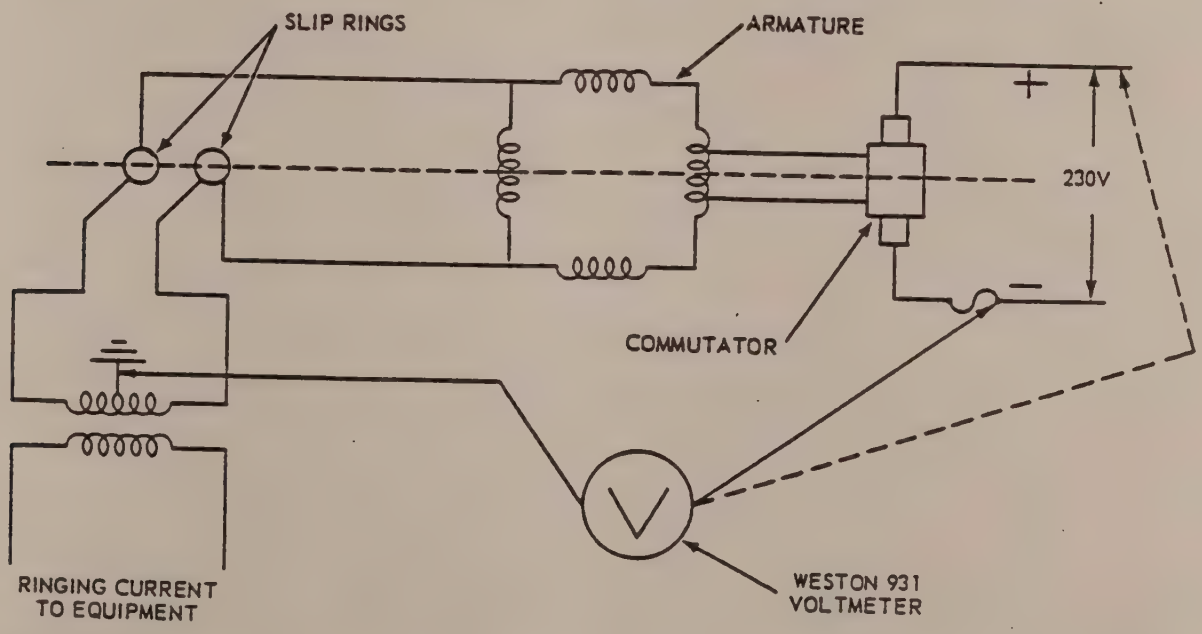

Figure 2. A Schematic Diagram of a Double Current Generator Showing Test Points Used When Taking Voltage Measurements.

6.02 Measure the output voltage with the Weston 904 AC Voltmeter. The meter should indicate the voltage shown in Table 3 for each particular frequency.

6.03 To adjust the ringing equipment to voltage requirements make FULL LOAD adjustments according to Manufacturer's instructions and/or the appropriate section in the GSP 205-200 series.

NOTE: This test is for FULL LOAD voltage ONLY.

Table 3. Full Load Voltage Requirements for Transistor Type Ringing Equipment. +- 5V

FREQUENCY	VOLTS
16-2/3 or 20 hertz	90
25 or 30 hertz	100
33-1/3 or 42 hertz	110
50 or 54 hertz	125
66-2/3 or 66 hertz	140

7. REPORTS

7.01 Complete the required reports in accordance with local practices.

02/07/94 *16 HZ *90 VOLTS
*40 HZ *110 VOLTS
*60 HZ *130 VOLTS
02/07/94
LD 10-15-93

SIXNOTES

CAUTION
CHANGES HAVE BEEN MADE
ON THIS PAGE.*
SEE ISSUE SHEET.
02/07/94

Permits

QB22.TXT

QUALITY BULLETIN

SUBJECT:

Change GT&E Standard Section 205-200-501

table 3 page 4of4 to read as follows;

NUMBER __QB22.TXT_____

DATE __7-19-89_____

PAGE ____1___ OF ___1____

SUPERSEDES NO. _NA_____

DATED ____NA_____

TO: J. TURK R. POWELL E. JOHNSON D. VOELKER G. STRAUB
B. GRIFFITH J. STEINAU J. CLARK LAB FILE QA FILE

Modify Table 3 page 4 of 4 to add the following frequencies, 16Hz, 40Hz, and 60Hz as noted by (*).

	Frequency	Volts (+/- 5v)
*	16, 16 2/3, or 20 hertz	90
	25 or 30 hertz	100
*	33 1/3, 40 or 42 hertz	110
	50 or 54 hertz	125
*	60	130
	66 2/3 or 66 hertz	140

Any questions should be directed to Don Voelker at 428-6259.

RETAIN THIS BULLETIN UNTIL FURTHER NOTICE [✓]

DISCARD THIS BULLETIN AFTER NOTING CONTENTS [ ]

THIS BULLETIN WILL BE INVALID AFTER (DATE) _____ [ ]

THIS BULLETIN WILL BE INCORPORATED INTO

PROCEDURE NO. _____ BY(DATE) _____ [ ]

SIGNATURE: JR Mallott TITLE Senior Admin - Quality Assurance

Inter-Office Memo

"Customer Excellence '89"

Date: August 17, 1989 **File:** EF-5

Subject: LORAIN LT15 RING GENERATOR CALIBRATION

From: W. R. Young (IFA3L)

To: D. L. Voelker (IFGDG)

Per our conversation on July 28, the input voltage for the LT15 ring generator during calibration should be 52.5 volts d.c. This voltage closely follows the normal office voltage of most central offices. If calibration is done on this generator with the input voltages set a 52.5 volts, then the unit should have the proper output voltage when connected to the central office battery in the field.

I appreciate the cooperation you have given us in this matter and know that the end result will be "Quality" service to our customers.

If you have any questions, please give me a call 219-461-3476.

Wm. R. Young

W. R. YOUNG
Staff Supervisor-Maintenance Administration

WRY:bjl

601072

Inter-Office Memo

"Customer Excellence '89"

GTE

Date: July 7, 1989 **File:** AD 1-7

Subject: RINGING GENERATOR CALIBRATION

From: W. R. Young (IFA3L)

To: D. L. Voelker (IFDGD)

With regards to our telephone conversation concerning the operating parameters for ring generators, the following system practice is supported by Maintenance Administration.

GTEP 205-200-501 (Issue 2, July, 1967)
RINGING MACHINES, RINGING CONVERTERS AND COIN BOX BATTERIES
OUTPUT VOLTAGE MEASUREMENTS

To meet current GTE standards, Table 3 should be referenced with respect to frequency and voltage requirements on transistor type ringing generators and not the manufacturers specification.

Sites receiving a Quality Assurance review will be inspected for compliance to established standards.

If you have additional questions, please give me a call at 461-3476.

Wm. R. Young

W. R. YOUNG
Staff Supervisor-
Maintenance Administration

cc: J. L. Roach (IFA3L)

C Lawrence
309-523-9904

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